1984

Contract growing of green peas and sweet corn with Green Giant and Libby's in southwestern Ontario.

Dennis Gerald. Tyszko
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CONTRACT GROWING OF GREEN PEAS AND SWEET CORN WITH GREEN GIANT AND LIBBY'S IN SOUTHWESTERN ONTARIO

by

Dennis Gerald Tyszko

A Thesis
submitted to the Faculty of Graduate Studies
through the Department of Geography
in Partial Fulfillment of the requirements
for the Degree of Master of Arts at
The University of Windsor

Windsor, Ontario, Canada

1984

To

My parents Alexander and Sabina,
My brother Leslie and My sister Diana

ABSTRACT

Agriculture has a vital role in the economy of Southwestern Ontario and a part of this agricultural scene in contract vegetable production. Green Giant of Tecumseh, Essex County and Libby's in Wallaceburg, Kent County are major processors of green peas and sweet corn. One method these companies use to secure these particular vegetable commodities for their processing operations is through the contracting of growers (farmers).

For Green Giant and Libby's contracting is a means whereby both companies can obtain adequate and continuous amounts of high quality green peas and sweet corn for processing. By contracting with farmers, both processors can avoid the frequent supply fluctuations which often occur in the non-contract crop production system. Because of this, they can maintain their roles as leading suppliers of quality processed green peas and sweet corn to the consumer.

Descriptive data obtained from an extensive, multi-stage survey of the green peas and/or sweet corn growers contracted with Green Giant and Libby's provides an extensive picture of: (1) distance (absolute and temporal) as a factor in contracting; (2) managerial prerequisites and their allocation between the processor and the grower; (3) the methods of production and handling of the contracted crop (4) various inputs (material and equipment, labour) and their organization; (5) various demographic and socioeconomic characteristics of the growers; (6) the size, locations and other functional aspects of the growers' farms and (7) the concerns of the growers and their various

viewpoints on contracting.

The results from the tests (Kendall Tau and Chi-Square) indicates that distance has no influence on the size of contracted acreages (economies of scale) for Green Giant and Libby's growers. Distance has no effect upon the number of tasks (labour inputs) provided by Green Giant and Libby's. The size of contracted acreage has no ascendancy on the number of inputs (material and equipment, tasks) provided by the company. Contracting experience has no weight upon the size of contracted acreage accorded to the growers by the companies.

For the majority of Green Giant and Libby's growers contracted in 1981, contracting had a minor part in total crop output when both contract and non-contract crops were considered. Most of the Green Giant and Libby's contracted growers had the bulk of their farmland under non-contract crop production and not contract crop production. Non-contract farming provided a higher volume of earnings for most of the growers. To both Green Giant and Libby's growers price security was the chief advantage in contracting.

ACKNOWLEDGEMENTS

First, a very special thanks to my parents, my brother and my sister for their unremitting support and understanding which truly helped me in the completion of this thesis.

Second, I wish to express my gratitude to my committee members: Dr. Ihor Stebelsky, Dr. Gerald Romsa and Dr. Victor Dirks for their guidance, suggestions and patience. Also my appreciation is extended to Blake Clarke of Green Giant and Ron Hall of Libby's for their cooperation and help.

Third, a sincere thanks to all the members of the Department of Geography, University of Windsor especially Ron Welch for his time, cartographic guidance and pep talks; Rick Dumala for his computer help, Rose Milks for extensive use of the map library and Elvina Kaszas for her inspiration.

Finally, I am grateful to the many people I have had the pleasure of meeting and knowing during my graduate work at the University of Windsor for their kindness and encouragement.

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CHAPTER I

INTRODUCTION

Contract farming is a form of vertical integration that emerged from the desire of processing companies and farmers to minimize the risks and uncertainty in agricultural production and marketing. The production of perishable commodities such as vegetables is particularly common in contract farming. In Ontario, a large percentage of the green peas and sweet corn were produced for processing through vertically integrated arrangements - contract integration (crop grown by farmer) and ownership integration (crop grown by company); (Table 1).

Distance is of prime consideration when a processor formulates his contracts with vegetable growers. The growing-processing system must remain as compact as possible, for transportation costs and perishability escalate with distance. Processors have often set objectives of contracting with farmers within certain limited distances. Helmberger and Hoos (1966, p. 153) found in their study that in order to minimize procurement-processing costs, plants obtain supplies of vegetables from local areas often within a radius of 30 miles. According to a study by the National Commission of Food Marketing, in all regions of the United States except the Pacific, more than three-fourths of the raw products utilized were secured within a 50 mile radius of the plant (National Commission of Food Marketing, 1966, p. 190).

Table 1

Comparison of Acreages Grown by Farmers Under Contract and by Processors for Sweet Corn and Green Peas, Ontario, 1961, 1963, and 1970

Crop	Acreage			Percent Change	
	1961	1963	1970	1961-63	1963-70
Sweet Corn					
Farmers	19,263	11,732	15,616	-39.1	+33.1
Processors	2,909	5,179	11,605	+78.0	+124.1
Total	22,172	16,911	27,221	-23.7	+61.0
Percent Grown By Processors	13.1	30.6	42.6		
Green Peas					
Farmers	14,584	11,519	12,127	-21.0	+5.3
Processors	2,417	5,690	5,944	+135.4	+4.5
Total	17,001	17,209	18,071	+1.2	+5.0
Percent Grown By Processors	14.2	33.1	32.9		

Source: Ontario Ministry of Agriculture and Food, Economics Branch, (October 1972), p. 50.

The primary objective of this study is to analyze the spatial aspects of one type of contract farming, the contract vegetable production of green peas and sweet corn in Southwestern Ontario (Essex, Kent, Middlesex, Huron, Elgin and Perth counties). Although spatial delimitations have been generally recognized, little research has been done to determine the extent of the spatial relationship between the processor (integrator) and the producer within specific areas (small area orientation studies). Other objectives will be to determine what is contract farming, to determine why farmers become involved in contract farming and to determine the extent to which farmers devote their operation to contracting.

The scope of this study will be on two vegetable processing companies Green Giant of Canada Limited in Tecumseh and Libby, McNeill Libby of Canada Limited in Wallaceburg and the contracted green peas and sweet corn farmers (growers) these two companies contract with.

Defining Vertical Integration and Contract Farming

Vertical integration is the combination of two or more links in the chain of production under the control of a single firm that extends from the primary producer to the final consumer. Control may or may not involve ownership of production resources (Mighell, 1957, p. 1666).

Mueller and Collins (1957, p. 1471) define grower-processor integration as the linking together, either contractually or otherwise, of farm and processing firms so that either or both relinquish certain decision-making powers in

producing and marketing their product.

Penn (1958, p. 1384) recognizes two methods of vertical integration; ownership and contract. By ownership integration, the power of decision-making is in a single set of hands regardless of who actually performs the production function. In contract integration, application of contracts or agreements transfer certain management responsibilities from one stage of the production process to another regardless of who actually owns the resources used at that stage.

Some economists favour a narrow definition of vertical integration in which stages of production are combined with regards to ownership. Those using this definition are usually concerned with questions of market control, the establishment of monopoly, and the breaking up of monopoly through vertical integration. Other economists concentrate their attention on decision-making and the allocation of resources, regardless of ownership. These economists view vertical integration as a means of linking together, or coordinating decisions of firms in two or more stages of the marketing and production processes (Seagraves and Bishop, 1958, p. 1814).

At the Fourth Annual Workshop of the Canadian Agricultural Economics Society (summer, 1959), for example, three discussion groups were unable to agree on the definition of vertical integration. Two groups adhered to the concept of owner integration, excluding all forms of contractual arrangements from the definition. The third group, however, accepted the possibility of the coordination of decision-making through formal contractual arrangements (Hill, 1966, p. 9).

Roy (1963, p. 3) on the other hand, recognized that integration through contracts - commonly known as "contract farming" comprises the largest segment of vertical integration. The remaining vertical integration by ownership consists of profit-type firms and cooperatives which own two or more successive stages. This Roy called "ownership integration." Roy defined "contract farming" as those contractual arrangements between farmers and companies, whether oral or written, that specify one or more conditions of production and/or marketing of an agricultural product (Roy, 1963, p. 3).

Vertical integration is the combining of independent firms with interrelated activities under single management and is oftentimes divided conceptually into forward and backward integration. Firms involved in the supply of productive units such as feed, seed and fertilizer, attempt to integrate forward and capture the producing unit that uses these inputs (forward integration). Firms involved in processing and marketing often attempt to integrate backward and capture the producing unit of the particular products (backward integration-contract farming); (Economics Branch, Ontario Ministry of Agriculture and Food, 1972, p. 12).

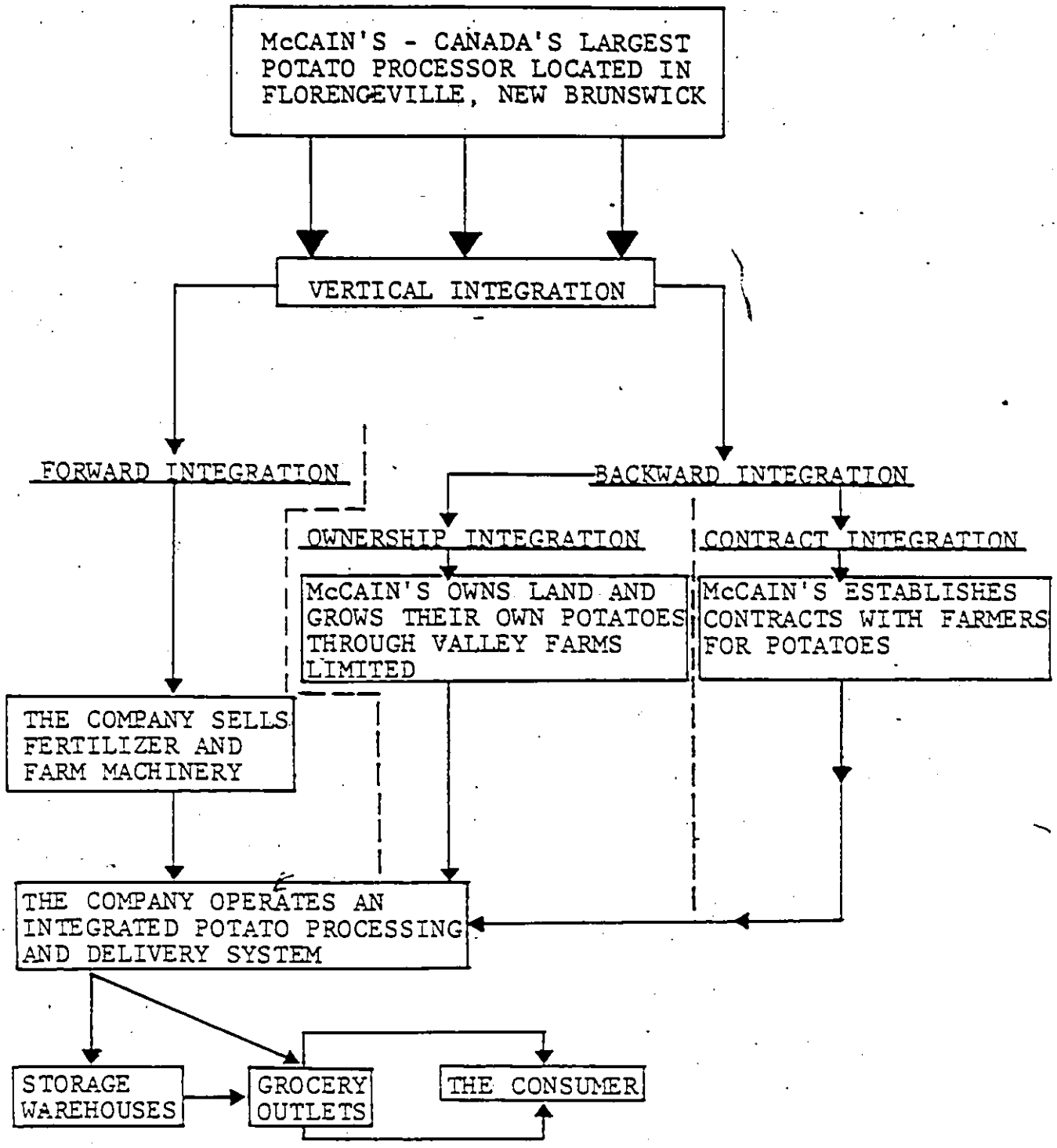
There are three types of integration: (1) ownership integration, (2) contract integration, and (3) integration through cooperatives. In ownership integration, the integrator owns or rents production facilities and takes full charge of production. Contract integration (or contract farming contract production) involves agreements between farmers

and processors, suppliers, dealers, or others who are usually entailed in the production-marketing process. By integration through cooperatives farmers who own and operate their own farms integrate backwards on a nonprofit basis to supply themselves with necessary inputs to their normal production activities. The formation and utilization of cooperatives may also enable farmers to become involved in the processing and marketing of agricultural products (Economics Branch, Ontario Ministry of Agriculture and Food, 197[illegible], p. 13).

A prime example of a Canadian company engaged in forward, backward, ownership and contract integration is McCain's in Florenceville, New Brunswick (Figure 1). McCain's is Canada's largest potato processor but it is also engaged in the selling of fertilizer and farm machinery (forward integration); as well they have an integrated potato processing and delivery system (forward integration). In normal times they buy between 60 percent and 75 percent of the New Brunswick potato crop. The company also owns a sizable amount of farm land (Valley Farms Ltd.) that is utilized for their own potatoes (ownership integration). But most of McCain's potatoes are raised through contracting with local farmers (contract integration). Each year a contract is negotiated and requires the farmer to deliver a specific amount of potatoes to the factory on a certain date at an established price (Warnock, 1978, p. 112).

FIGURE 1

A FLOW CHART ILLUSTRATING VERTICAL, FORWARD, BACKWARD, OWNERSHIP AND CONTRACT INTEGRATION



Source: Warnock, (1978), p. 112.

CHAPTER II

LITERATURE REVIEW

Vertical integration and contract farming have been studied mainly by agronomists, market analysts, agriculture economists, farm economists, and food processing economists. In the mid 1950's there was an expansion of interest with the majority of studies emphasizing production and marketing aspects of vertical integration and contract farming. Poultry broiler raising has been the customary case in illustrating the concepts and virtues of vertical integration and contract farming (Seaver 1957, Mortenson 1958, Henry and Raunikar 1960, and Hill 1966).

According to Roy (1963) certain factors affecting market, credit, management, labour, farm size and technology may be decisive in convincing the farmer to assume either independent status or contract farming (Table 2). Because of these factors, discussions in the 1960's and in the 1970's expanded and considered vertical integration-contract farming and technology, efficiency, farm management, decision-making, independence, the farm family, farm tenure, marketing boards, contracts and bargaining and its status as a temporary or established trend in agriculture.

Vertical integration and contract farming have been studied from several points of view:

1. Vertical integration and contract farming as a temporary or established trend in agriculture.

Table 2

Factors Influencing the Adoption of Independent or Contract Farming Status

Economic Situation	Preferred Mode of Farming	
	Independent	Contract
Expected market prices	High	Low
Market situation	Available and open	Unavailable
Credit situation	Low interest rate	High interest rate or unavailable
Management skill	Good	Poor
Availability of labour	Scarce and busy	Plentiful and underemployed
Market competition	Good	Imperfectly organized
Farm size	Large-an economic unit	Very small
Technological change	Slow	Fast

Source: Roy, (1963), p. 378.

2. The impact of vertical integration and contract farming on production and marketing.

3. The impact of vertical integration and contract farming on land tenure, farm management, decision-making and independence.

4. The impact of vertical integration and contract farming on income, capital, and the family farm.

5. The impact of vertical integration and contract farming on technology and efficiency of operations.

6. The impact of vertical integration and contract farming on the production and/or processing of certain agricultural commodities such as poultry (broilers), beef cattle, hogs, and various types of fruits and vegetables.

7. The impact of marketing boards, bargaining, and marketing agreements on vertical integration and contract farming.

Vertical Integration and Contract Farming as a Temporary or Established Trend in Agriculture

Mortenson (1958) is skeptical about vertical integration being a permanent trend in agriculture because individual cases described in various articles have not endured the test of time. To Mortenson, there is not enough evidence in published cases to verify that vertical integration is firmly established.

In an opposing viewpoint Leckie (1959) comments that critics of integration concede it is here to stay and it will likely increase. According to Leckie, further studies pertaining to vertical integration will focus on the various forms it may take and the speed of its establishment in specific lines of agricultural production.

In the United States, Roy (1963) claims contracting is firmly established in broilers, hatching eggs, turkeys, table

eggs and vegetables for processing. It is gaining a foothold in hog, cattle, and sheep feeding and dairying.

Breimyer (1964) believes farming is losing its agrarian character and as agricultural marketing becomes larger and more powerful, alternate forms of organization and control are unavoidable. In the organization and control of American farm production and marketing there are two possible directions of change. One is to multiple units or super farms, probably accomplished by nonfarm capital and under nonfarm control. The other is to an integrated relationship between farms and their markets.

According to a study in the United States by the National Commission on Food Marketing (Organization and Competition in the Fruit and Vegetable Industry, June, 1966) contract farming has made a major contribution towards fulfilling the needs of processors for high quality fruits and vegetables meeting their specifications. In 1964, fruit and vegetable canners in the United States obtained 70 percent of their crops through contracted agreements with growers (Table 3). The remaining crops were purchased from growers not under contract. Only 8 percent of the fruits and vegetables canned in 1964 were obtained from land owned or rented by canners (Table 3). The amount of crops supplied by grower cooperatives and brokers was small and only negligible quantities were obtained from farmer's markets or other processors. Among those plants using contract procurement in 1964, 30 percent reported an increase in the proportion of the crops obtained in this manner while only 7 percent reported a decrease since 1954 (National

Table 3

Sources of Raw Product For Fruit and Vegetable Canning Plants, by Region in the United States, 1964a [Percent of Total Raw Product]*

Source	Southeast	Southwest	Northeast	Midwest	Pacific	United States
Owned or rented land	19	4	7	19	4	8
Contract: Written	11	56	43	66	80	67
Contract: Oral	2	13	4	5	2	3
Noncontract from farmers	55	17	23	8	10	15
Grower Cooperatives	1	.....	10	1	3	3
Brokers	5	8	12	1	(x)	3
Farmers' markets	.....	2	(x)	.....	.....	(x)
Other processors	.....	.....	(x)	(x)	1	(x)
Other	7	.....	1	(x)	.....	1
Total	100	100	100	100	100	100

a Based on 154 canning plants.

* Weighted on basis of total plant output.

(x) Less than ½ of 1 percent.

Source: U.S., National Commission of Food Marketing, (June 1966) p. 185.

Commission on Food Marketing, 1966, pp. 185-186).

In April of 1967, the Canadian Cabinet appointed a Task Force to study, analyze and recommend solutions in conjunction with farm problems encountered in Canadian agriculture. The Task Force found that vertical integration was firmly established in various agricultural sectors. The Task Force resolved that it would take no action to promote or prohibit vertical integration by agribusiness. It recommended that the Canadian government continue to support legislation that promotes marketing boards which have a major role in the contracting system (Federal Task Force on Agriculture, 1969, p. 20).

Providing a general view of the patterns and practices that will dominate Canadian agriculture in 1980, Purnell, Andarawena and Stutt (1969) state vertical integration has not become widespread in all areas of production and marketing. They conclude that integration is not expected to increase by 1980 but this is questionable because they use the poultry industry sector as a general indicator of vertical integration within the whole Canadian agricultural system.

Purnell and Heighton (1970) claim integration and contractual arrangements have become widespread in some sectors of farm production, particularly in poultry, meat, eggs, fruits, and vegetables for processing. Any future vertical integration in Canadian agriculture will be determined by the relative importance of the economic and technical conditions that favour such developments.

The Impact of Vertical Integration and Contract Farming on Production and Marketing

A substantial portion of study and research by agriculture market analysts, agriculture economists, and farm economists focuses on vertical integration and contract farming as a viable solution to production and marketing problems experienced in Canadian and American agriculture.

The North American consumer, in making foodstuff purchases, expects to obtain uniform high quality products at an affordable price. This demand for high quality food products in large enough quantities has made it necessary for both supermarket retailers and food processors to influence directly agricultural production of certain foods. The demands of the processor, the supermarket and the consumer are satisfied by means of vertical integration through contract farming.

Mueller and Collins (1957) claim market considerations are one set of factors that encourage vertical integration and contracting. Retailers tend to specify the characteristics of the products their customers want. Consequently, demand for agricultural products both at the processing and farm levels has become structured within a product specifications range. Today only one or very few product classes are chosen by the retailer (product specification). Retail food outlets require uniformity of product, stability of supply and availability in large volumes. For the processor, the above-mentioned requirements will be obtained only if output from

a large number of separate farms is coordinated.

Penn (1958) insists that market considerations are more influential than technological factors for establishing vertical integration. Eight main forces are responsible for the growth of integration, of which six are market considerations and two are technological (Penn, 1958, p. 1386). They are, in summarized form: (1) the need for adequate and stable supplies, (2) the need for continuous supplies, (3) the need for better supplies, (4) efforts of farmers to spread and reduce risk, (5) efforts of farmers to improve prices or create a market, (6) efforts of farmers to reduce costs, (7) efforts of farm suppliers to expand the market for farm supplies, and (8) efforts of either farmers or business firms to improve efficiency of resources used in farm production.

Others who claim that vertical integration and contracting improves the effectiveness of production and marketing are Leckie (1958 and 1959), Smith and Christian (1961), Vatter (1961), Roy (1963), Sorenson (1964), Breimeyer (1965), Helmberger and Hoos (1966), The National Commission on Food Marketing, Organization, and Competition in the Fruit and Vegetable Industry (1966), Kohls (1967), Dubov (1968), Doll, Rhodes and West (1968), Capstick (1970), Greig (1971), Kidd (1971), Roy, Coty, and Sullivan (1971), Allen (1972), Snodgrass and Wallace (1975), Breimeyer (1976), and Hill and Ingersent (1977).

Impact of Vertical Integration and Contract Farming on Land Tenure, Farm Management, Decision-Making and Independence

When vertical integration become popular in agriculture, various researchers expressed concern that vertical integration may deprive the farmers of their land tenure status, management and decision-making powers, and independence.

Mighell (1957), Penn (1958), and Mortenson (1958) believe vertical integration tends to shift the decision-making from farm to outside business firms and thus deprives the farm of its independence. The farmer may no longer manage an independent farm business, instead, he becomes a farm labourer or labourer-landlord with services to sell to interested businesses.

For farmers with small inefficient farms, the real problem therefore, is to convert the family farm in size, capital requirements and technique quickly and systematically into a highly efficient family operated unit. This can be achieved by means of vertical integration yet farmers are reluctant to yield control of their operations to outside businesses because they cherish the traditional freedom of making their own management and marketing decisions (Mortenson, 1958).

When agricultural production is integrated with other activities, some decisions are shifted from the farm manager to the party mobilizing the process. According to Kohls (1958, p. 1802) the important decisions that could be shifted are:

1. What to produce - from the viewpoint of the

integrated effort "what" refers to quality and other physical aspects of the product.

2. How much to produce - the quantity problem.

3. When to produce - the timing and coordination of the flow of the product.

4. What methods will be used - the technological considerations of how the activity will be performed.

Kohls believes vertical integration does not deal with an outright purchase of property rights but it is a contractual exchange of specific freedoms and property rights between two parties.

In contract farming, there is voluntary departure from traditional independence in deciding what to produce and where and when to market it. But there are compensating factors for the loss of independence such as reduction of price risk and uncertainty, technical assistance, credit in line with demonstrated ability and an annual outlet with adequate incentives for efficiency and quality (Leckie, 1959, p. 59).

Miller (1960) indicates that even though farm tenure problems are recognized, they are emphasized relatively little in the literature on vertical integration. Farms that are most likely to become integrated are those in which the productivity of land or labour or both are relatively low as a result of restricted capital or inferior management or both. Miller (1960) and Leckie (1959) predict that farmers in the younger age groups (owner operators) are more likely to become involved in integration because they are often limited in management and capital resources. By entering into vertical

integration young farmers would not only improve the organization of their resources; it would also increase the quantity of resources used and thus the income-earning potentials of their farms (Miller, 1960, p. 308).

Older owner operators become involved in integration contracts mainly to divest themselves of certain management responsibilities and to maintain the income levels they want. However, the preference of integrators for farmers with little experience, to whom they might dictate managerial practices, should tend to hold down the number of older operators entering into integration (Miller 1960, p. 308).

Before the advent and growth of vertical integration in agriculture, the dominant institutional character of agriculture was determined by the rules of land ownership and tenure. Today the character of the farm can be substantially affected by the farm's relationship to its suppliers and buyers through vertical integration (Breimyer, 1965).

The Impact of Vertical Integration and Contract Farming on Income, Capital and The Family Farm

According to Davis (1957) farmers with low incomes are pressured to integrate their farming functions with other businesses because they have not adjusted to technology. Farm operators of small inefficient units lack the capital to invest in new technology. One alternative to capital shortage is vertical integration.

The individual farmer is willing to enter contract farming because of a desire to increase volume of business, to

raise net income and reduce costs and to escape from the feeling of financial insecurity within the framework of the traditional marketing system (Leckie, 1958, p. 1363). As land values and the costs of buildings, breeding stock, and agricultural equipment increase, the family-owned and operated farm faces increasing difficulty of securing satisfactory amounts of major working capital (Leckie, 1959). Solutions to such capital problems may be sought in a choice between sharing rental agreements or integration by contract.

Seagreaves and Bishop (1958) fear the family farm is becoming technologically outmoded and its enterprises controlled by outside business interests. The survival of the family farm depends upon the ability and willingness of farmers to adjust to changing economic conditions.

Roy (1963) assumes the future family farm will be under great pressure for more capital and better management, both of which vertical integration (contract farming) can provide. Roy believes the family farm will not be eliminated by contract production but actually safeguarded by it. If the small farmer can produce efficiently and meet production specifications then he can survive under contract agriculture.

The Federal Task Force on Agriculture (1969) reported the perennial warning about the gradual dissolution of the family farm particularly in the poultry and fruit and vegetable production sectors. Whilst the Task Force acknowledged increasing involvement in contract production in the two sectors, it concluded that the family farm, always changing in order to

expand and improve efficiency, will remain the fundamental production unit in agriculture.

To Paarlberg (1970) family farms are the basis of American agriculture producing the bulk of the farm products. Farms that are either large scale, factory type, corporate in legal form, or integrated in their structure, are relatively few in number and produce the minority of food, feed and fiber. They are highly specialized units, producing few commodities, and found mostly in a few regions.

The American farmer can challenge the threat of vertical integration by organizing farmer cooperatives. Cooperatives can provide marketing advantages connected with their size and integrated operations, yet retain decision-making at the family farm level.

According to the Ontario Ministry of Agriculture and Food ("Corporate Farming and Vertical Integration in Ontario, 1972") vertical integration benefits agriculture by increasing production and marketing efficiency, improving product quality and lowering production and marketing costs. But vertical integration also causes problems because it contributes to the movement towards larger farm operations and resulting in a decrease in the number of smaller farms and the displacement of farm families.

In relation to social costs, it is difficult to determine to what extent vertical integration has contributed to problems of adjustment in agriculture. It may have had a greater impact in certain local areas and in certain types of operations (Economics Branch, Ontario Ministry of Agriculture

and Food, 1972, p. 21).

The Impact of Vertical Integration and Contract Farming on Technology and Efficiency of Operations

In the United States, there are between two and three million farms that are too small to take full advantage of opportunities offered by technological progress (Davis, 1957, p. 304). To solve this problem, Davis suggests that a national agribusiness policy based on vertical integration be developed in the United States. Some type of policy is needed so that farmers on undersized farm units with a lack of technological background and managerial ability are able to reorganize their farming operations on a sound and efficient basis.

Appraising vertical integration in the broiler industry, Seaver (1957) disagrees that new technology or new management practices will increase the efficiency of the poorer producing broiler processing plants. He believes it is unlikely that many of those who were independent producers become more efficient as part of an integrated firm because technology and production techniques in the broiler industry are similar and generally universally known (Seaver, 1957, p. 1488).

Mighell (1957) believes vertical integration increases the scale and efficiency of farm operations but it also reduces risk for both the grower and dealer. One of the reasons why a farmer becomes involved in vertical integration is because of a need for technical advice and practical management suggestions for improved efficiency (Penn, 1958). To Trifon (1959) vertical integration will result in technological unity and an uninterrupted flow of materials from one

stage of production to another. This will inevitably result in certain physical savings and reduction of unit costs of production.

Ogren and Scoville (1961) consider contracting as a method which encourages the use of improved strains of varieties, carefully balanced livestock rations, and improved marketing and handling practices (Ogren and Scoville, 1961, p. 256). An increase in the number of integration arrangements between farmers and suppliers, processors and distributors will ultimately speed up technical progress in certain areas of agriculture.

Wood (1962) stresses that technological change in marketing is unavoidable and therefore producers in various producing regions must adopt their production operations to new technologies or run the risk of losing markets to producers in other regions. Contract farming enables a producer with the help of the integrator, to employ new technologies.

Farms of today must be of adequate size to adopt technology and have the proper managerial capacity to utilize it. Where this is not the case technological advancement may be very slow, or it may be accomplished only through integration of processing and agricultural production output (Seaver, 1964, p. 257). A farm establishment that cannot survive on the open market system has no other alternative but to become involved in some form of vertical integration.

Radberg (1966) believes that farmers live in a world deeply influenced by 20th century technology but they have not completely escaped from 19th century agricultural organization,

alternatives, and rates of return. The inability or unwillingness among farmers to finance the more capital intensive techniques results more from the instability of the industry than from the small size of farm businesses (Padberg, 1966, p. 1397). Improvements in efficiency are available to certain sectors of the farm economy through vertical integration of agricultural production by food processors, distributors, or supply firms.

The Impact of Vertical Integration in Contract Farming on the Production and/or Processing of Agricultural Commodities

Seaver (1957), Leckie (1958), Mortenson (1958), Henry and Raunikar (1960), Hill (1966), and Paarlberg (1970) appraise vertical integration in the poultry raising (broiler) industry. To Seaver (1957) the establishment of vertical integration in the broiler industry was not just for greater technical efficiency but it was also an attempt by firms and individual owners to reduce risks and uncertainty through market control. Seaver stated that two major variations of integration exist in the broiler industry - owner integration and contract integration. In owner integration the firms own the hatching, feed mixing, processing and production facilities. In contract integration, the firms have established written contract arrangements with producers.

In the last twenty years the poultry industry has become leading example of vertical integration (Leckie, 1958). Broiler output in the United States was only 100 million pounds in 1940, tripled by 1948, doubled again by 1950 and by

1955 reached one billion pounds or ten times the 1940 output. A similar trend developed in Canada with Canadian commercial output of broiler meat in 1957 at 125 million pounds, compared to only 30 million pounds in 1953 (Leckie, 1958, p. 1358).

The broiler industry has changed and grown with major improvements in nutrition, genetics, management, processing and distribution. For the feed supplier, the grower, the processor, and the buyer, vertical integration is an effective method in reducing unit costs of operation (Mortenson, 1958).

In the more common type of integrated broiler operation the feed supplier controls the operations of the grower, determines to a greater or lesser extent the feeding and management program and decides when and where the birds are to be sold. A slightly different form of integration in this industry is a contractual arrangement between the feed supplier, the grower, the processor, and the buyer of the processed birds (Mortenson, 1958, p. 1861).

Henry and Raunikar (1960) stipulate that vertical integration is an effective method in dealing with the problems of quality, volume, growth, and change and spatial organization in the broiler industry. They believe vertical integration will extend into other segments of animal agriculture, such as table eggs, turkeys, beef livestock, hogs and dairy cattle on a large scale basis.

There are broiler growers who require larger buildings, better equipment, improved breeds, and top quality feed. To procure these, large amounts of capital are needed and this is

available by contractual agreements between growers and processors. In 1960, 88 percent of the broilers produced in Ontario were grown or marketed under some form of contract and only 14 percent of the growers with about 13 percent of the production capacity were independent (Hill, 1966, p. 11).

Agricultural traditionalists believe that the integration movement in the poultry industry is a real threat to agricultural fundamentalism. Those who have accepted integration in the broiler industry believe it is an approach to agricultural production which can be implemented for production of other types of farm commodities. The primary issue at hand is to determine if the organizational approach (integration) adopted by the broiler industry is a unique and special case that cannot be expanded throughout agriculture or is it a firm indicator of what all agriculture will be like in the future (Paarlberg, 1970, p. 112-113).

In the case of corn-hog production new technological and biological complexities are making it difficult for the farmer-manager and his family to maintain the corn hog production system. Costs rise before the full gains from specialization can be achieved (Blaich, 1960, p. 1288). But hog feed dealers have the financial and managerial capabilities to introduce changes. The recent integrating behaviour by hog feed manufacturers represented attempts to create a monopolistic market for their hog feed (Blaich, 1960, p. 1292).

Araji (1976) estimates production efficiency coefficients for three systems of beef cattle operations (cow-

calf, cow-yearling, and completely integrated) in order to evaluate the effects of size and system on the efficiency of beef production. The results of the study indicated that in general, fixed cost and transportation and handling costs associated with the three systems of beef operation strongly support vertical integration in beef cattle production.

As for processing tomatoes in Canada the factors having the greatest influence on supply are: cost of production, distance, and transportation facilities from the farm to the processing plants, and conditions laid down in producer-processor contracts (Pando, 1969). Pando (1969, p. 13) concludes that contracting for tomatoes between processors and growers will continue and by 1980, southwestern Ontario will probably be the only major tomato producing region in Canada because: (1) physical factors impose a limit on the area planted to tomatoes for processing; (2) labour costs, location and transportation facilities restrict the area planted; and (3) in terms of efficiency Ontario in comparison to Quebec and British Columbia is the most suitable area for producing processing tomatoes.

Kidd (1971) confirms that contracting is the dominant method of procuring potatoes for processing in Canada. Contract farming arrangements are necessary in order to provide supplies to meet and satisfy processing schedules and to allow greater control for the processor in relation to the quality and cost of the produce.

According to the U.S. Department of Agriculture, in

1970, the proportion of total farm production under vertical integration arrangements was 22 percent (5 percent under ownership integration and 17 percent under contracting). Since 1960, there was an increase of 1 percent in ownership integration and 2 percent in contracting, for a total increase of 3 percentage points (Economics Branch, Ontario Ministry of Agriculture and Food, 1972, p. 26). Even though total agricultural production under vertical arrangements in the United States is relatively small, vertical integration (contract production) for certain agricultural commodities such as vegetables for processing, citrus fruits, sugarbeets, seed crops, fluid-grade milk and broilers is quite high (Tables 4a and 4b).

The impetus for ownership integration in vegetable processing was initiated by the availability of speculative land. Vegetable processors could rent the land at relatively low prices because owners were interested in holding it for speculative purposes rather than using it for agricultural production. The report concluded that since 1963, ownership integration in vegetables for processing has grown slowly and will continue to do so. Contracts guarantee farmers a market with prices and terms that, being collectively negotiated, are the best possible under any given situation.

Anderson and Daniel (1977) deal with the location, structure, mode of operation and future development of Canada's fruit and vegetable processing industry. Processors obtain domestically-grown raw product through open markets, contracts

Table 4a

Estimated Percentage of Output Produced Under Vertical Integration Arrangements in the United States, 1960 and 1970 (*)

Commodity (livestock items)	Production Contracts		Ownership Integration	
	1960	1970	1960	1970
Fed cattle	10.0	18.0	3.0	4.0
Sheep and lambs	2.0	7.0	2.0	3.0
Hogs	.7	1.0	.7	1.0
Fluid-grade milk	95.0	95.0	3.0	3.0
Manufacturing-grade milk	25.0	25.0	2.0	1.0
Eggs	5.0	20.0	10.0	20.0
Broilers	93.0	90.0	5.0	7.0
Turkeys	30.0	42.0	4.0	12.0
Miscellaneous	3.0	3.0	1.0	1.0
TOTAL	27.2	31.4	3.2	4.8

(*) The estimates for individual items are based on the informed judgements of a number of production and marketing specialists in the U.S. Department of Agriculture. The totals were obtained by weighting the relative items by the relative weights used in computing the ERS index of total form output.

Source: Ontario Ministry of Agriculture and Food, Economics Branch, (October 1972), p. 27.

Table 4b

Estimated Percentage of Output Produced Under Vertical Integration Arrangements in the United States, 1960 and 1970. (*)

Commodity (crops)	Production Contracts		Ownership Integration	
	1960	1970	1960	1970
Feed grains	.1	.1	.4	.5
Hay and forage	.3	.3	---	---
Food grains	1.0	2.0	.3	.5
Vegetables for fresh market	20.0	21.0	25.0	30.0
Vegetables for processing	67.0	85.0	8.0	10.0
Dry beans and peas	35.0	1.0	1.0	1.0
Potatoes	40.0	45.0	30.0	25.0
Citrus fruits	60.0	55.0	20.0	30.0
Other fruits and nuts	20.0	20.0	15.0	20.0
Sugarbeets	98.0	98.0	2.0	2.0
Sugarcane	40.0	40.0	60.0	60.0
Other sugar crops	5.0	5.0	2.0	2.0
Cotton	5.0	11.0	3.0	1.0
Tobacco	2.0	2.0	2.0	2.0
Oil bearing crops	1.0	1.0	.4	.5
Seed crops	80.0	80.0	.3	.5
Miscellaneous crops	5.0	5.0	1.0	1.0
TOTAL	8.6	9.5	4.3	4.8

(*) The estimates for individual items are based on the informed judgements of a number of production and marketing specialists in the U.S. Department of Agriculture. The totals were obtained by weighting the relative items by the relative weights used in computing the ERS index of total form output.

Source: Ontario Ministry of Agriculture and Food, Economics Branch, (October 1972), p. 29.

and company production. Producers use contracts, especially those supplying seed and harvesting services, almost exclusively for a number of vegetables including peas, beans, corn, cucumbers, and cauliflower. To extend and level out the season, processing firms grow some products (mostly peas, corn, and beans) for their own processing (Anderson and Daniel, 1977, p. 12).

Contract Farming - Marketing Boards, Contract Arrangements and Bargaining

Contract arrangements for vegetables for canning, sugar beets, and tree fruits has been a common and accepted practice for a number of years (Leckie, 1958). The bargaining process and the establishment of contract terms has replaced the open market in the marketing of certain agricultural products.

In the vegetable processing industry written contracts between processors and growers are common. Important conditions include a price structure reflecting quality differences, acreage to be planted by the grower, cost of seed, grading procedures and standards, provisions for settling disputes, control over planting and harvesting dates, insect control methods to be used, deductions for waste, and service and equipment charges (Helmberger and Hoos, 1966, p. 171). In the vegetable processing industry, the exact provisions of the contract vary from one crop to another and between geographic areas.

Kohls (1967) classifies contacts into three broad

categories which represent varying degrees of integration. The three types of contracts are market specification contracts, resource providing contracts, and management and income guaranteeing contracts.

Market-specification contracts specify the product characteristics acceptable to the integrator. Little or none of the producer's management decisions are transferred to the integrator. The producer receives little or no financial or technical help. The integrator is not responsible for the producer's price or income risks. Any financial returns for the producer are connected to the open market. Market-specification contracts enable the integrator to improve the effectiveness of grades and standards, and market information. For the producer, this type of contract guarantees a buyer if all specifications are met (Kohls, 1967, p. 246).

Resource-providing contracts often specify the type and level of certain production resources to be used and the place of their purchase. The integrator provides the producer with operational and fixed investment financing, managerial help and supervision. Product prices are based upon the open market and for the producer income guarantees are minimal (Kohls, 1967, p. 246).

Management and income guaranteeing contracts often include the marketing and production conditions of the aforementioned two types of contracts. This type of contract provides for the shifting of part or all of the market price and income risks from the producer to the integrator. This is done

by paying the producer a prearranged return per unit of product or by guaranteeing against market-oriented financial loss (Kohls, 1967, p. 247).

By examining cooperative bargaining in the tomato processing industry, Babb, Belden, and Saathhoff (1969) found that there were significant differences between grower and processor bargaining attitudes. They developed a model of the bargaining process in the tomato industry and ascertained that bargaining parties' contract objectives are related to their perception of economic, historical, organizational, and demographic factors which they translate into relative bargaining power (Babb, Beldon, and Saathoff 1969). In the contractual agreement they investigated, the growers from Indiana and Ohio were mostly concerned with price while the contract processors placed primary importance on quality factors.

In analyzing 44 contracts for green peas and 32 contracts for sweet corn in Wisconsin in 1968, Jesse and Johnson, Jr. (1970) attempted to discover if variations in quoted prices among contracts could be explained in terms of variations in the specifications of the other contract provisions. The contract provisions examined that were common to both the pea and sweet corn contracts included seed charge, harvest charge, tare, passed acreage, date of payment, insecticide application, and yield bonus. Additional provisions for peas included herbicide application, net return guarantee, field size bonus and late planting bonus; for sweet corn, early planting bonus and high moisture bonus. Three additional

variables included in the analysis were not contract provisions but were felt to be potential determinants of the contract base price: (1) number of other commodities processed by the firm, (2) size of firm and (3) degree of competition in the purchase of raw product (Jesse and Johnson, Jr., 1970, pp. 547-548). The variables were measured by the appropriate F-tests and as a result of the 14 variables relating to the pea contract, 6 entered significantly in the final model (seed charge, harvest charge, tare, passed acreage, insecticide application and net return guarantee). Of the 12 variables relating to the sweet corn contract, 8 were significant (harvest charge, passed acreage, insecticide application, yield bonus, high moisture bonus, additional products produced, firm size, and competition). The results of the analysis of the contracts supported their hypothesis that contract variations in the quoted base price are indeed associated with variation in contract provisions.

Kidd (1971) indicates that in potato marketing contracts the major areas dealt with are: (1) varieties to be planted, (2) acreage to be planted, (3) planting and harvesting dates, (4) harvesting and storage methods, (5) minimum quality specifications, (6) month of delivery to plant, (7) method of weight and grade determination, and (8) method of price settlement, including schedules of monthly prices and bonuses for above average grades. Minor areas covered by contracts are: (9) cultural practices with respect to use of seed, fertilizers and other chemicals, (10) supply of credit by processor, and

(11) field services by processor (Kidd 1971, p. 14).

Hiscocks (1972) explains the theory and evolution of agricultural market regulation in Canada. Market regulation involves establishment of marketing boards which directly affect the flow of farm produce from the farmer to the consumer, the arrangements for that flow and the resultant prices (Hiscocks 1972, p. 20). For the producer, the objectives of market regulation are: (1) to maintain or increase the incomes of the producers of the particular product, (2) to stabilize income from the sale of that product, and (3) to standardize the terms of sale of that product (Hiscocks 1972, p. 21). As an organizational power, marketing boards eventually prevent one group (producers or processors) from having all the advantages and benefits.

In Ontario, the Vegetable Growers Marketing Board created through the Farm Products Marketing Act is a government delegated authority which oversees and ratifies all agreements between growers and processors for price, terms, and conditions of sale of 12 vegetables including green peas and sweet corn grown for processing (Fedorkow, 1978).

CHAPTER III

THE FRUIT AND VEGETABLE PROCESSING INDUSTRY IN CANADA: NATIONAL AND REGIONAL PERSPECTIVES

Green Giant and Libby's are a part of the diversified and complex Canadian fruit and vegetable processing industry which is comprised of canning, freezing, dehydrating, frying, and pickling. The value of shipments of the industries' goods of own manufacture increased from $981.8 million in 1975 to $1.5 billion in 1980. The value added increased from $388.6 million to $616.9 million and wages increased from $168.6 million to $252.8 million. But the number of full time employees in the fruit and vegetable processing sector decreased from 19,519 in 1975 to 17,570 in 1980 due to automation and consolidation (Table 5).

The Canadian fruit and vegetable processing industry is dominated by large foreign owned conglomerates. The major fruit and vegetable processing firms in Canada are Campbell's Soup, H. J. Heinz, McCain's Foods, Canadian Canners (Del Monte and Aylmer products), Nabob Foods, Green Giant, and Libby's (Table 6). McCain's Foods, a family owned enterprise based in New Brunswick, is the only independent, Canadian owned firm comparable to the foreign owned giants.

The early period of the fruit and vegetable processing industry in Canada was typified by many small plants located at or near the source of supply. The industry was widely decentralized as fruits and vegetables were grown on a commercial basis in every Canadian province except Newfoundland.

TABLE 5

Fruit and Vegetable Processing In Canada, Manufacturing Statistics 1980

Year	Number of Establishments	Number of Employees	Salaries and Wages	Value of Shipments of Goods of Own Manufacture (a)	Value Added (b)
			Thousands of Dollars		
1975	246	19,519	168,685	981,885	388,601
1976	241	18,714	183,134	1,055,043	417,137
1977	223	17,173	186,926	1,100,839	449,584
1978	232	17,351	206,614	1,225,753	460,683
1979	236	17,533	226,089	1,421,694	550,001
1980	232	17,570	252,852	1,553,865	616,987

(a) "Value of Shipments of Goods of Own Manufacture" represents the net selling value of shipments of goods produced by the reporting establishment or made under contract for it from its own materials.

(b) "Value Added" is the value of net output as calculated by shipments of goods of own manufacture plus the net change in inventories of goods in process and finished goods, less the cost of materials, supplies, fuel and electricity purchased and used.

Source: Statistics Canada (1982), Fruit and vegetable processing industries, Principal Statistics, 1972-1980, Catalogue 32-218, p. 1.

TABLE 6

The Leading Fruit and Vegetable Processors in Canada

Company	Ownership/Control	1971 Sales
Campbell Soup Co. Ltd.	U.S.-Campbell Soups	$70,505,000
H.J. Heinz of Canada Ltd.	U.S.-H.J. Heinz	$66,205,000
McCain's Foods Ltd.	Canada-McCain Family	$60,000,000
Canadian Canners	U.S.-Del Monte	$58,582,000
Nabob Foods Ltd.	Switz-Nestle	$31,532,000
Green Giant of Canada Ltd.	U.S.-Green Giant	$31,000,000
Libby McNeill & Libby of Canada Ltd.	Switz-Nestle	$31,000,000
Stafford Foods Ltd.	Canada-Burns Foods	$ 9,040,000
Sun-Rype Ltd.	Canada-B.C. Growers	$ 8,424,000
Canadian Home Products Ltd.	U.S.-American Home Products	$ 8,110,000

Source: Warnock (1978), p. 121.

The growth of small canneries was aided by the municipal bonusing system but eventually this led to too many plants, a high failure rate and overcapacity production. In 1905, a major monopoly was created in the fruit and vegetable processing industry: the formation of the Canadian Canners Company, a merger of twenty-four Ontario factories (Warnock, 1978, p. 105). The creation of this monopoly was the start of the regionalization of the Canadian fruit and vegetable processing industry.

Presently fruit and vegetable processing has become centralized within three Canadian provinces: Ontario, Quebec, and British Columbia but it is most predominant in Ontario (Tables 7 and 8). In Ontario the chief fruit and vegetable processing regions are Essex and Kent, Toronto, Hamilton, Belleville and Niagara (Table 9).

In Canada, most of the major pea and corn processors were established in Ontario (Table 10). The key growing counties in Ontario for green peas are: Essex and Kent; Prince Edward; Elgin, Middlesex and Oxford; and Huron and Perth (Table 11). Notable sweet corn production counties are Elgin, Middlesex and Oxford; Essex and Kent; Prince Edward; and Durham, Northumberland, Ontario and Victoria (Table 12). Pea processors are located in the Central, Southeastern, and Southwestern regions of Ontario and major corn processors are situated in the Central and Southwestern regions of the province. This study focuses on Green Giant in Tecumseh, Essex County and Libby's in Wallaceburg in Kent County and the green peas and sweet corn growers contracted by the two companies in 1981 (Table 13, Map 1).

TABLE 7

Location of Canada's Fruit and Vegetable Processing Plants 1979 and 1980

Province or Territory	Number of Establishments 1979	1980
Newfoundland	0	0
Prince Edward Island	3	3
Nova Scotia	12	11
New Brunswick	5	5
Quebec	59	59
Ontario	110	108
Manitoba	6	6
Saskatchewan	2	2
Alberta	6	5
British Columbia	33	33
Yukon and Northwest Territories	0	0
Canada	236	-232

Source: Statistics Canada (1982), Fruit and vegetable processing industries, Principal Statistics, 1972-1980., Catalogue 32-218, p. 1.

TABLE 8

Fruit and Vegetable Processing - Comparisons Among Canada, Ontario, Quebec and British Columbia, Manufacturing Statistics 1980

	Canada	Ontario	% of Canada	Quebec	% of Canada	British Columbia	% of Canada
No. of Establishments	232	108	46.5	59	25.2	33	14.2
No. of Production Workers	13,145	6565	49.9	1,910	14.5	1,628	12.4
No. of Total Employees	17,570	9241	52.6	2,538	14.4	1,972	11.2
Value of Mfg. Shipments ($000)	1,553,865	842,016	54.2	215,370	13.9	173,870	11.2
Value Added - Mfg. ($000)	616,987	329,668	53.4	84,644	13.7	51,537	8.4

Source: Statistics Canada (1982), Fruit and vegetable processing industries, Principal Statistics, 1972-1980, Catalogue 32-218, p. 1.

TABLE 9

Location of Canada's Fruit and Vegetable Processing Plants 1974

Region or Province	Canning	Freezing	Dehydrating or Frying
Vancouver & Fraser Valley Area	15	19	0
British Columbia-Okanagen Area	7	2	0
Alberta	3	3	2
Manitoba	2	0	2
Ontario-Essex and Kent	29	6	0
Ontario-London	2	2	0
Ontario-Hamilton	16	8	0
Ontario-Niagara	14	2	0
Ontario-Toronto	28	9	2
Ontario-Georgian Bay	1	1	2
Ontario-Belleville	17	6	0
Quebec-Quebec City Area	6	10	0
Quebec-Montreal	58	2	1
New Brunswick	1	3	2
Nova Scotia	7	7	2
Prince Edward Island	3	3	0
Canada	209	83	13

Source: Anderson (1977), p. 14.

TABLE 10

The Location of Major Pea and Corn Processors In Canada By Province 1981

Province	Number of Establishments	
	Pea (a)	Corn (b)
Prince Edward Island	2	0
Nova Scotia	2	1
New Brunswick	1	0
Quebec	6	7
Ontario	14	11
Alberta	3	2
British Columbia	5	4
Canada	33	25

Sources: (a) Statistics Canada (1981), Catalogue 32-023, Vol. 10, No. 4, p. 3-10-4.

(b) Statistics Canada (1982), Catalogue 32-023, Vol. 10, No. 6, p. 5-10-6.

TABLE 11

Acres of Green Peas for Processing, By Area, Ontario, 1970 to 1974

	1970	1971	1972	1973	1974	Mean Acreage
Essex, Kent	5,894	5,160	5,993	6,742	8,377	6,433.2
Brant, Norfolk	743	903	1,529	717	776	933.6
Huron, Perth	2,215	1,776	1,852	2,902	2,888	2,326.6
Elgin, Middlesex, Oxford	3,153	3,366	3,474	5,561	4,707	4,052.2
Haldimand, Wentworth, York	736	935	912	1,347	1,996	1,185.2
Hastings, Lennox and Addington	764	---	197	270	543	443.5
Durham, Ontario, Northumberland	1,603	1,662	1,832	1,649	2,606	1,870.4
Prince Edward	2,962	3,988	3,998	5,161	4,850	4,191.8
Total	18,070	17,790	19,787	24,349	26,743	21,436.5

Source: Abraham (1975), Table 2, p.2.

TABLE 12

Acres of Sweet Corn for Processing, By Area, Ontario, 1970 to 1974

	1970	1971	1972	1973	1974	Mean Acreage
Essex, Kent	7,547	8,266	9,605	9,683	8,973	8,814.8
Huron, Perth; Lambton	1,370	1,560	1,295	2,242	2,004	1,694.2
Elgin Middlesex, Oxford	11,339	12,707	15,195	15,858	16,867	14,393.2
Brant, Norfolk	2,186	1,970	1,058	1,484	312	1,402.0
Haldimand, Wentworth	1,267	1,475	1,507	1,475	1,474	1,439.6
Durham, Northumberland, Ontario, Victoria	1,558	2,686	2,723	2,647	2,857	2,494.2
Hastings, Lennox & Addington	1,342	543	521	271	960	727.4
Prince Edward	612	1,654	2,410	3,862	4,026	2,766.2
Total	27,221	30,861	34,314	37,522	37,473	33,731.6

Source: Abraham (1975), Table 4, p.3.

TABLE 13

The Location of Major Corn and Pea Processors in Ontario 1981*

Location	Region	County, Regional or District Municipality	Municipality	Name of Processor	Type of Operation Green Peas(a)	Sweet Corn(b)
A	Central	Prince Edward County	Wapoos	Wapoos Canning Company Ltd.	x	
B	Central	Prince Edward County	Cherry Valley	Hyatt Canning Limited	x	
C	Central	Prince Edward County	Bloomfield	Baxter Canning Co.	x	
D	Central	Hastings County	Deseronto	Arctic Gardens Inc.	x	x
E	Central	Hastings County	Trenton	Produce Processors (Trenton Cold Storage)	x	x
F	Central	Regional Municipality of Durham	Whitby	Stokely-Van Camp of Canada Ltd.	x	x
G	Central"	North York-District Municipality of Toronto	Willowdale	York Farms(Div. of Canada Packers Inc.)		x
H	Southeastern	Regional Municipality of Niagara	Niagara Falls	Gerber Products of Canada Ltd.	x	
I	Southeastern	Brant County	Burford	York Farms(Div. of Canada Packers Inc.)	x	
J	Southwestern	Huron County	Exeter	Canadian Canners Limited	x	x
K	Southwestern	Middlesex County	Lanteth	Produce Supply (Div. of Hardee Farms International Ltd.)	x	x
L	Southwestern	Middlesex County	London	Green Giant of Canada Limited		x
M	Southwestern	Kent County	Chatham	Campbell Soup Co. Ltd.	x	
N	Southwestern	Kent County	Paincourt	King Canning Inc.		x
O	Southwestern	Kent County	Wallaceburg	Libby McNeill & Libby of Canada Ltd. (Div. of Nestle Enterprises Ltd.)	x	x
P	Southwestern	Essex-Kent County	Wheatley	Onstead Foods Ltd.	x	x
Q	Southwestern	Essex County	Tecumseh	Green Giant of Canada Ltd.	x	x

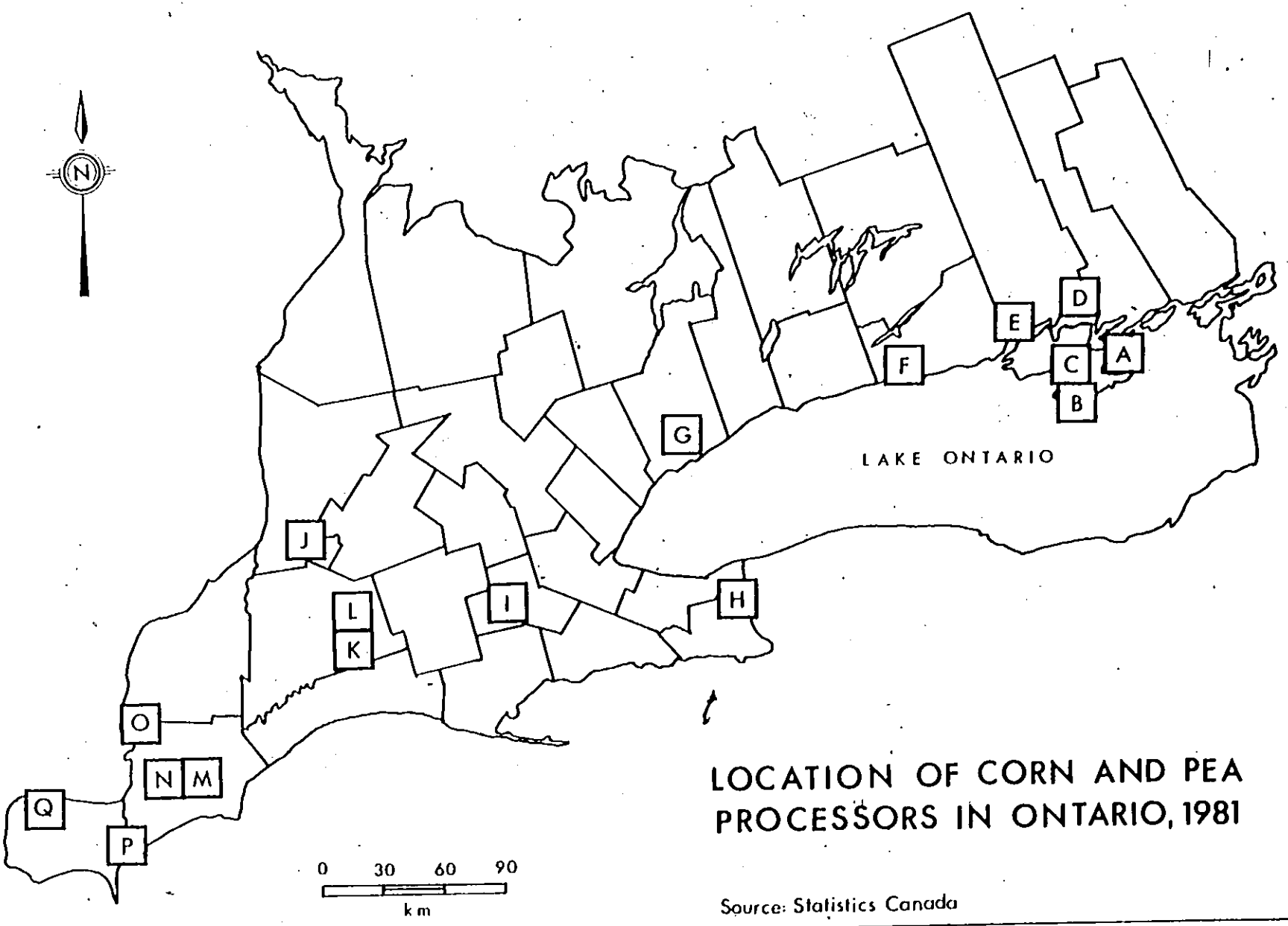
x Indicates type of Operation

Sources: (a) Statistics Canada (1981), Catalogue 32-023, Vol. 10, No. 6, p. 3-10-4.

(b) Statistics Canada (1982), Catalogue 32-023, Vol. 10, No. 6, p. 5-10-6.

*Location of Processors on Accompanying Map, Next Page.

Map 1



LOCATION OF CORN AND PEA PROCESSORS IN ONTARIO, 1981

Source: Statistics Canada

CHAPTER IV

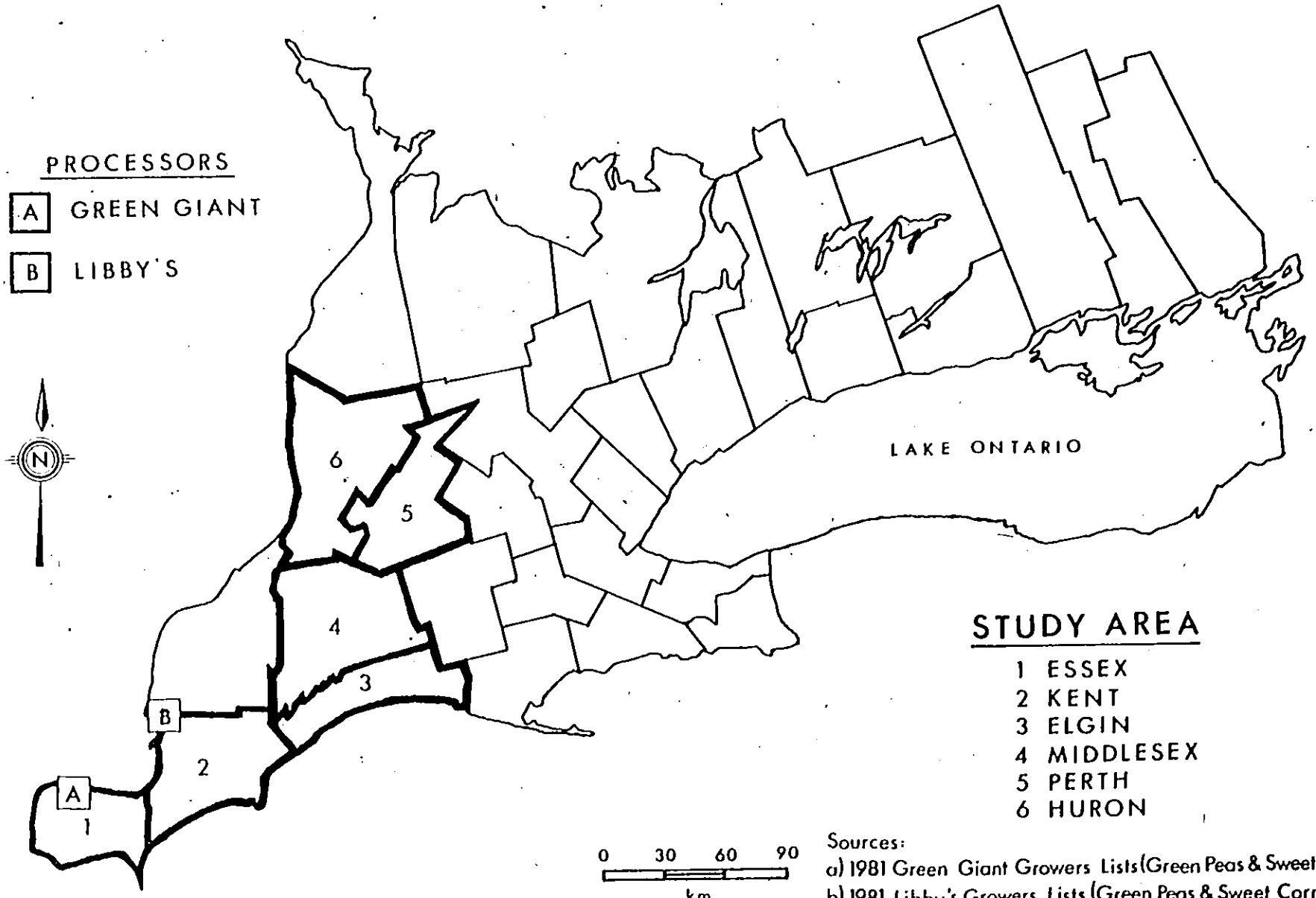
STUDY AREA

The delimitation of the study area is dictated by the locations of 1981 contracted green peas and sweet corn growers for Green Giant in Tecumseh, Essex County and Libby's in Wallaceburg, Kent County (Map 2, Appendix 1). Green Giant growers of green peas and sweet corn were located in Essex County. For Libby's, all green peas and the majority of sweet corn growers contracted with Libby's were located in the neighbouring Elgin, Middlesex, Huron and Perth Counties.

A noticeable observation is that none of the growers contracted by Libby's were located in Lambton County, even though it is close to Wallaceburg. Crop growing is not as intensively developed in Lambton as in the counties of Kent and Essex because of the knoll and sag relief of the bevelled till plain. Most of the farms in Lambton depend upon the sale of meat animals for a major part of their incomes.

Both Essex and Kent Counties comprise a region which is one of the most varied and richest farming areas in Canada. In both counties agricultural production and related processing industries are second in importance to automotive and automotive-related industries. In terms of types of foods processed, vegetable processing is predominant in Essex and Kent Counties. Seven of the 10 largest food processing companies in Essex and Kent are specifically engaged in vegetable processing and this includes Green Giant and Libby's who are both involved in green peas and sweet corn processing (Table 14). Full-time employment

Map 2



Sources:
a) 1981 Green Giant Growers Lists (Green Peas & Sweet Corn)
b) 1981 Libby's Growers Lists (Green Peas & Sweet Corn)

TABLE 14

The Major Fruit and Vegetable Processing Plants of Essex and Kent Counties

Company and Plant Location/Locations	No. of Employees and Products Produced
a) H.J. Heinz Company Leamington, Essex County	over 1600 full-time employees; produces wide variety of tomato products, ketchup, soup, baby food, pickles, spaghetti and vinegar
b) Libby, McNeill, Libby of Canada Ltd. Wallaceburg and Chatham in Kent County	600 full-time employees at both plants, increases to over 1200 with harvest season. Wallaceburg-production of spaghetti, noodles, wide variety of vegetable products; Chatham-production of deep brown beans, sauerkraut, red kidney beans, tomato juice and whole tomatoes processed.
c) Omstead Foods Wheatley, Essex County	500 full-time employees; processing a wide line of frozen vegetables and fish products.
d) Canadian Canners Windsor, Amherstburg, and Leamington in Essex County Dresden in Ken County	150 full-time employees at the four plants, increases to over 1300 during the harvest season; production of variety of tomato products, red beets, white and sweet potatoes, spinach, asparagus, soup, jams, and marmalades, citrus drinks and juices and prune products.
e) Green Giant of Canada Ltd. Tecumseh, Essex County	120 full-time employees and more than 750 seasonal employees, canning and freezing a wide variety of vegetable products.
f) Campbell Soup Co. Ltd. Chatham, Ken County	60 full-time employees, seasonal employment is 500; production of tomato based vegetable drinks.
g) Hunt Wesson Food of Canada Ltd. Tilbury, Kent County	30 full-time employees and 120 seasonal employees, production of tomato sauce and tomato paste.

Sources: (a) Pink, (1980) p. F4.

(b) Gibson (1982) p. D10.

for the 7 companies is 3,060. When the canning season reaches its peak in the late summer early fall period, another 3,270 people are hired as seasonal help by Libby's Canadian Canners, Green Giant, Campbell Soup and Hunt Wesson Foods (Table 14). But this number does not include the smaller processing plants and seasonal canneries, the people working in fresh-produce packing sheds, freelance truckers who transport the harvested vegetable crops to processors and the farmers and those who help them in growing various vegetables. The harvesting of green peas and sweet corn is highly mechanized and therefore capital intensive but the actual processing of sweet corn and green peas is labour intensive. The huge demand for labour by all processors, large or small is seasonal, occurring from June to October.

For Green Giant and Libby's, the establishment of contracts with farmers ensures that they will procure the needed amounts of commodities of sufficiently high quality standards. For this to happen, the contracted crops must be grown on favourable soils under suitable climatic conditions.

Climatic and Soil Requirements For Green Peas and Sweet Corn Production

Certain physical requirements (temperature, water, soil) are needed for green peas and sweet corn production. Green peas should be planted when soil temperatures at a depth of 3 inches are about 50°F (Agriculture Canada, Research Branch, 1982, p. 31). Green peas grow best in cool, humid climates; the pea seed can germinate at 40°F, its optimum temperature for rapid uniform germination is about 68° to 70°F. The best green

peas yields occur when temperatures are 59° to 64.4°F (Nonnecke, 531, p. 3; Agriculture Canada, Research Branch, 1982, p. 31). Since green pea plants grow better in cool weather, good quality high yields are attained by early planting and plant maturation before high summer temperatures occur. High temperatures during the flowering stage may lead to reduced yields thus it would be more suitable to plant green peas so that the period of maximum blooming occurs in the cooler parts of the growing season.

Green peas need an adequate and regular moisture supply during the growing season and especially at the germination period. During germination pea seeds require at least 33% soil water over the permanent wilting point, a point significantly higher than those for most other vegetable crops (Nonnecke, 531, p. 4). For green peas best yields take place when rainfall for May, June and July is frequent and totals about 12 inches (Agriculture Canada, Research Branch, 1982, p. 31).

Although green peas can grow on a relatively wide range of soil types from very sandy to very heavy clays, the ideal conditions for maximum, high quality yields are well drained soils with good water holding capacity, high organic matter and adequate fertility.

Sweet corn requires a minimum soil temperature of 50°F for germination and root development; the optimum soil temperatures needed for germination and seedling development are 64° to 72°F. When planted at approximately 3 inches below the soil surface, about 68 degree-days above 50°F are needed for plant emergence (about 10 days); (Agriculture Canada, Research Branch,

1982, p. 12).

During the day, sweet corn will not grow unless the air temperature is at least 50°F and at night it will grow at 40°F rather than the 50°F minimum during the day. The night time temperature will support sweet corn growth because during the day under normal conditions, the soil absorbs and stores a substantial amount of heat from the sun but this heat is slowly lost throughout the night. Because of this temperature phenomenon, for most of the night the soil is warmer than the air which will allow for continuation of seed germination and root growth (Brown, Kerr, and Cobbledick, 1975, p. 1).

For production of sweet corn, a good moisture supply is imperative. Sweet corn needs at least 19 inches of rain during the growing season. If there are high evapotranspiration losses ranging from 8 to 12 inches during the growing season, low yields will occur. Growth and maturation of sweet corn is hindered by water shortages at the flowering and fruit set stages (Agriculture Canada, Research Branch, 1982, p. 13).

Sweet corn production can be carried out on a wide range of deep soils but they must be amply fertile, have a good moisture holding capacity and sufficient aeration. Sweet corn can be grown on loams, clay loams and clays but there must be appropriate surface and subsurface drainage. Good drainage is necessary especially in the spring because dry soils will warm early to allow for the early planting of sweet corn.

The market for which green peas and sweet corn are processed directly affects the decision of which type and/or variety of crop to be planted. In order to spread the

production schedule and maximize factory operations during the processing season, the processor has a number of green peas and sweet corn varieties contracted out to growers (farmers). Each variety has a different range of maturity--early, mid-season and late--providing for a continuous and orderly supply of harvested contract green peas and sweet corn. Growers contracted by processors have little say in the choice of varieties of green peas and sweet corn to be planted and processed.

In order to provide for a better classification and more orderly harvests, keeping track of accumulated heat units can be used for green peas and sweet corn production. For every specific variety of green peas and sweet corn a certain number of heat units is prescribed from planting to maturity. Of course such conditions as soil fertility, soil type, slope, drainage, depth of planting, vigor of seed and drought can cause some variance in the number of heat units required for different varieties of green peas and sweet corn. For example, according to a report by Brown, Kerr and Cobbledick (1975) entitled "Scheduled Planting Of Sweet Corn," forty-six different cultivars (varieties) of sweet corn can be grown in Ontario. Each cultivar requires a certain number of corn heat units and days to maturity before it can be harvested for processing. For example, the magnitude of corn heat units and days to maturity ranges from 1,550 corn heat units and 53 (seed catalogue) to 73 days (Vineland Research Station) maturity period for Polarvee cultivar to 2,350 corn heat units and 92(seed catalogue) to 104 days (Vineland Research Station) for the Silver Queen cultivar to reach maturity (Brown, Kerr and Cobbledick, 1975, p. 3).

Physiography, Soils and Farming Activities of The Study Area

All Green Giant contracted green peas and sweet corn growers except for those in the Harrow area were located on the Essex Clay Plain, a subregion of the St. Clair Clay Plains. The St. Clair Clay Plains extend to the east and south of Lake St. Clair in Essex and Kent Counties and along the St. Clair River in Lambton County, covering 2,270 square miles. They include the following: the Essex Clay Plain, the Harrow Sand Plain, the Leamington Sand Plain, Pelee Island, the St. Clair Delta, the Chatham Flats and the Lambton Clay Plain. Ranging in elevation from 575 to 700 feet, the St. Clair Clay Plains show little relief. Only the moraine between Ridgetown and Bleinheim, which rises 50 to 100 feet above the general surface, deflects the drainage northward to Lake St. Clair (Chapman and Putnam, 1966, p. 240).

The Essex Clay Plain, covering most of Essex County and the southwestern portion of Kent County, consists of bevelled till covered with shallow deposits of locustrine clay. The prevalent soils in the Essex Clay Plain are the Brookston series of clay and clay loams which have the characteristics of Dark-Grey Gleisolic soils. Since this soil type is often saturated with water during the year, dredged ditches (surface drainage) and tile drainage (subsurface drainage) are needed to alleviate problems of poor drainage and provide the right soil conditions for crop cultivation. By utilizing artificial drainage, crop farming on the Essex Clay Plain is diverse and lucrative. Important crops grown in this region are grain corn,

soy beans, soft winter wheat, oats, alfalfa, hay, early potatoes, sugar beets, tobacco, barley and vegetables for processing such as tomatoes, green peas, sweet corn, white beans, lima beans, green and wax beans, cucumbers, cabbage and carrots. Although there is livestock production in this region especially hogs, cash cropping prevails.

Growers contracted by Green Giant in the Harrow area are situated on a slightly elevated (625 feet) sand plain. The plain was formed as a group of shallow-water sandbars in the post-Pleistocene Lake Warren (Chapman and Putnam, 1966, p. 243). The loam and sandy loams of the Harrow series, resembling the Guelph catena, are well drained Grey-Brown Podsolic soils. They were formed on poorly sorted outwash material which resulted from action by waves on a sandy moraine. These soils are typified by sandy materials containing scattered stones from bouldery ridges. At one time, the Harrow area was a significant flue-cured tobacco centre but this has changed and now the main crops cultivated are asparagus, tomatoes, sweet corn and other truck and canning crops.

In Kent County, most of the green peas and sweet corn growers contracted by Libby's are located in an area extending from Chatham to Wallaceburg on the Chatham Flats. This flat area, 256 square miles in extent, is located east of Lake St. Clair in Dover and Chatham townships (Chapman and Putnam, 1966, p. 244). Separating the Essex Clay Plain and the Lambton Clay Plain, the Chatham Flats are covered with a deep lacustrine clay, but in the Chatham township the clay is capped with a

shallow surface layer of sand. To the south and east of the city of Chatham there are beds of silt and west of Chatham in Dover township, the stratified clay appears at the surface except in some spots where clay is broken by an accumulation of black muck or sand. The soils of the Chatham Flats belong to the Brookston series of the Dark-Grey Gleisolic soil group. Although poorly drained, they are highly fertile.

In the Chatham Flats the emphasis is on the production of cash crops, with the raising of livestock (beef cattle, hogs) secondary in importance. Some hay, barley and oats are grown for feed but the prominent crops grown are corn, soy beans, winter wheat, white beans, black or barley tobacco, tomatoes, green peas, sweet corn and other canning crops.

All Libby's contract growers located outside of Kent County grew sweet corn in the following physiographic regions: the Bothwell Sand Plain (grown in the Chatham, Tupperville, Dresden areas of Kent County, in the Dutton area of Elgin County); and Ekfrid Clay Plain (growers in the Dutton and St. Thomas areas of Elgin County); the Mount Elgin Ridges (growers in the St. Thomas area of Elgin County, the Glanworth and Belmont area of Middlesex County); the Stratford Till Plain (growers in the Lucan, Granton areas of Middlesex County, St. Marys, Kirkton areas of Perth County, Centralia, Exeter, Hensall areas of Huron County).

The Bothwell Sand Plain, to the east of the St. Clair Region covering some 700 square miles is the delta of the Thames River in glacial Lake Warren (Chapman and Putnam, 1966, p. 238).

This particular feature consists of sands spread thinly over the clay floor thus the area tends to have poor drainage along with low grade soils (Chapman and Putnam, 1966, p. 238). Since most of this region is covered by only three or four feet of sand over clay, water permeates the sandy surface but collects and seeps slowly through the clay. In the wetter parts of this region, most of the land remains wooded but canning crops are grown on Berrien sandy loam, a Grey-Brown Podsolic soil.

South of the Caradoc Sand Plain in Ekfrid Township and extending eastward to the St. Thomas area is the Ekfrid Clay Plain, a region of stratified clays covering 360 square miles (Chapman and Putnam, 1966, p. 238). Most of the surface is level except in places where it is cut by gullies or where knolls and ridges of sand and gravel appear on the clay surface. The clay beds in this region vary in thickness and are thinnest between the Thames River and St. Thomas where boulder clay appears at the surface. The predominant soils in this region are the Perth and Haldimand series. Perth is a clay loam with imperfect drainage belonging to the Grey-Brown Podsolic group, while Haldimand is a clay with imperfect drainage, also part of the Grey-Brown Podsolic group of soils. Raising crops on both soils is possible with the use of tile drainage. Even though there are some Libby's sweet corn growers in this area, livestock farming (beef cattle, hogs, poultry) is the chief agricultural activity of the region.

Located between the Thames Valley and the sand plain of Norfolk and Elgin Counties are the Mount Elgin Ridges. This

feature consists of a series of ridges and vales covering an area of about 563 square miles which includes the southeastern portion of Middlesex County, southern Oxford and adjoining parts of Elgin and Brant counties (Chapman and Putnam, 1966, p. 233). The ridges are moraines consisting of brown calcareous clay or silty clay but in the vales there is alluvium of gravel, sand or silt. Within this region there are two major contrasting soils, Huron clay loams on the well drained ridges and Perth silt loams with imperfect to poor drainage in the hollows and lowlands. In this area the trend is to utilize the low lying areas for pasture and cultivate crops such as sweet corn along the ridges. This region is noted for its dairy and livestock production but crops are grown also such as oats, hay, grain corn, silage corn, wheat and mixed grains.

The Stratford Till Plain is an extensive clay plain of 1,370 square miles stretching from London to Blyth and Listowel in the north with a projection towards Arthur and Grand Valley (Chapman and Putnam, 1966, p. 210). This region is an area of ground moraine broken by several terminal moraines. In the southwestern portion of this region, the moraines are closely spaced but the northern part is mostly level, interrupted by one or two moraines. The moderate ridges and other well drained sections are covered by the Huron series, Grey-Brown Podsolic soils but the flanks of the ridges and the undulating parts of the plain are dominated by the Perth series, Grey-Brown Podsolic soils. The more even, flatter parts of the plain are poorly drained with the surface being of the Brookston series,

Dark-Grey Gleisolic soils. Both the Brookston and Perth series require filed drainage for crop cultivation.

In this region, livestock (cattle, hogs, poultry) and livestock by-products (milk and eggs) are the most important farm commodities produced. Although there is some fruit and vegetable production in this region, it is of little significance.

Soil and Agriculture Potential

Most of the growers contracted by Green Giant and Libby's are located in regions where the prevalent soils have imperfect to poor drainage but good agricultural potential. The Canada Land Inventory, based on a system of land capability classification for agriculture, indicates the high potential of the land farmed by the growers of this area. According to the CLI, land in the first 3 classes is suitable for the production of commonly cultivated crops. Growers contracted with Green Giant and Libby's were located on lands of the two highest classes.

Class 1 land, according to the CLI, is of highest potential, for it has no physical impediments for the cultivation of crops. Most of the class 1 land in Canada (51.4 percent or over 800,000 acres) is found in Ontario. Except for some scattered areas of class 1 land in eastern Ontario, most of it is in Ontario south of the Canadian Shield (Environment Canada, Lands Directorate, 1979, p. 5). Indeed, the growers contracted by Libby's in Middlesex, Huron and Perth counties were situated on class 1 land.

Growers contracted by Green Giant and Libby's in Essex and Kent counties were located on Class 2 land. Class 2 land has moderate limitations for growing crops. Soils are deep with good water-holding capacity, can be managed fairly early, and are moderately high to high in productivity for an extensive range of field crops. Limitations pertaining to soils on class 2 land can be harsh regional climatic conditions, abating effects of erosion, inferior soil structure or slow permeability, low fertility, the presence of gentle to moderate slopes and the occurrence of excessive moisture or overflow (Environment Canada, Lands Directorate, 1979, p. 3). The major limitations on the class 2 land in the study area are poor soil structure, impeded permeability, and excessive moisture (imperfect to poor drainage).

For the Green Giant and Libby's growers located in areas with soil characteristics of imperfect to poor drainage, good land drainage management is necessary for proper cultivation of green peas and/or sweet corn. It has been estimated that 40% of the agricultural land in southern Ontario is poorly drained and that 20% is imperfectly drained (Ontario Agricultural College, Department of Land Resource Science, 492, p. 39). Two types of land drainage can be used in imperfectly to poorly drained areas: surface drainage and subsurface tile drainage. Where soil permeability is very slow, tile drainage is ineffective, and surface drainage should be implemented. Land leveling and plowing in narrow lands are methods which aid in the

collecting of water and releasing it into drainage ditches or ground waterways.

In subsurface tile drainage systems, water infiltrates the soils and flows into clay, concrete or plastic tiles or into perforated pipes and is released into drainage ditches or some type of outlet. Before the planning and designing of tile drainage systems can be carried out, the permeability attributes of the soil and type of crops to be grown must be recognized.

Before installing a land drainage system, a farmer should take account of the following factors: the cash value or feeding value of adaptable crops, the soil texture, the availability of good drainage outlets, the proportion of good and poor land in the area to be drained and how drainage will fit into the total farm management program (Ontario Agricultural College, Department of Land Resource Science, 492, pp. 39-40).

Many benefits can result from land drainage: increased number of crops that may be grown, greater crop quality, longer growing season at the beginning for planting and at the end for harvesting, fewer seedbed problems and lower labour and machinery costs, greater plant resistance to drought from deeper more extensive rooting, lower frequency of crop heaving and winterkilling, better soil aeration and soil structure, earlier crop growth (a dry soil warms up faster) and more efficient use of farm machinery (Ontario Agricultural College, Department of Land Resource Science, 492, pp. 39-40).

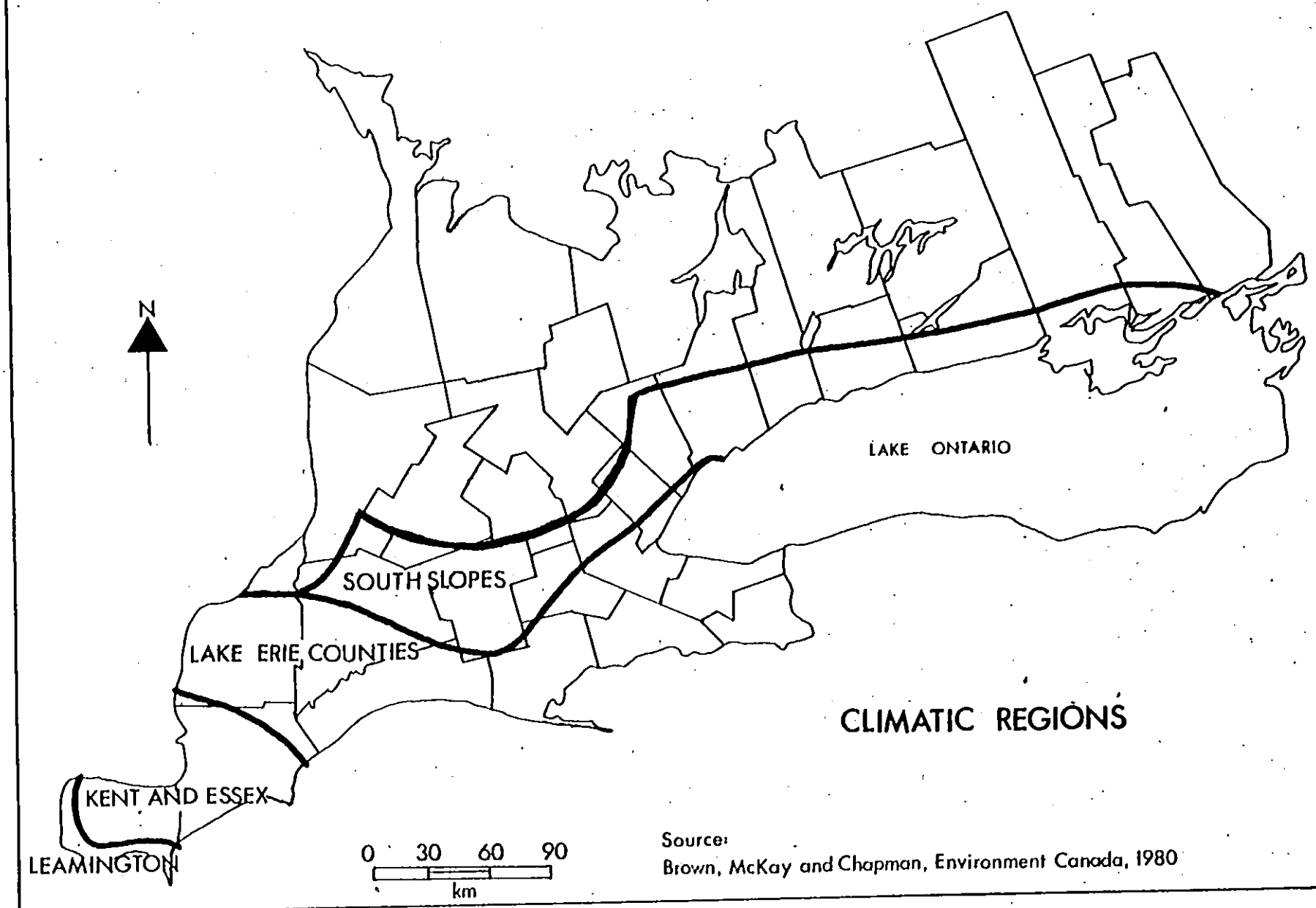
Climate of The Study Area

The green peas and sweet corn growers contracted by Green Giant and Libby's were located in several climatic regions. The Green Giant growers were situated in the climate regions of Leamington (including Amherstburg and Harrow areas of Essex County), and Kent and Essex (Windsor, Oldcastle, Maidstone, Woodslee, Tecumseh, Emeryville, Belle River, St. Joachim, Stoney Point, Tilbury, Ruthven and McGregor areas of Essex County); (Map 3).

Libby's growers were in the climatic regions of Kent and Essex (Wallaceburg, Tupperville, Dresden, Thamesville, Kent Bridge, Dover Centre, Grand Point, Paincourt and Chatham areas of Kent County), Lake Erie Counties (Rodney, West Lorne, Dutton and St. Thomas areas of Elgin County), and South Slopes (Glanworth, Belmont, Lucan, Granton areas of Middlesex County, St. Mary's and Kirkton areas of Perth County, and the Centralia and Exeter areas of Huron County); (Map 3).

The climate of the study area could be generalized as consisting of warm summers, relatively mild winters and a long growing season with unreliable rainfall. Variations in climate within the study area occur because of three notable factors: topography, the proximity of the Great Lakes and the prevailing winds. The Great Lakes contribute to rainfall patterns and they can add or take away a great deal of heat which crosses them. Thus the Great Lakes are instrumental in moderating the extremes of temperature. In the spring the Lake's copling effect retards flowering of fruit trees (orchards) past the period when damaging

MAP 3



CLIMATIC REGIONS

Source:
Brown, McKay and Chapman, Environment Canada, 1980

frosts occur and in the fall it reduces the risk of early frosts. This influence over frost is critical for fruit trees but not important in relation to vegetables. Although the Great Lakes do affect the climate of the study area, their influence is greater near the shoreline in comparison to inland areas. Due to the influence of the Great Lakes, the growers contracted by Green Giant in the Leamington climate region take advantage of the earliest, warmest and longest growing season in the province.

In relation to the growing season, the frost free period, the perennial crop growing season and growing degree days provide specific information which may be useful in establishing which type/varieties of crops might be grown where and when they are expected to reach their respective maturity.

The frost free period is defined as the interval between the average dates of the last occurrence of frost in the spring and the first occurrence of frost in the fall. Frost occurs when the temperature drops to less than 32°F. This interval is important in determining when it is safe to grow tender crops such as green peas and sweet corn and when blossoms and fruit are unlikely to be damaged by frosts (Brown, McKay and Chapman, 1980, p. 31). The growers contracted by Green Giant located in the Leamington climatic region had the longest frost free period in the study area; the mean annual frost free period is 170 days (Table 15). Most of the growers contracted by Green Giant and Libby's were situated in the Kent and Essex climatic region, with the mean annual frost free period at 165 days (Tables 15, 16). For those sweet corn growers contracted by Libby's outside

TABLE 15

Green Giant Growers (Green Peas and/or Sweet Corn) and Climatic Factors

	CLIMATIC REGIONS	
	Leamington	Kent and Essex
Mean Annual Temperature °F	49	48
Mean Daily Maximum Temperature °F-January	32	31
-April	55	55
-July	81	82
-October	62	61
Mean Daily Minimum Temperature °F-January	20	19
-April	37	36
-July	64	62
-October	45	43
Mean Date of Last Frost in Spring	May 1	May 5
Mean Date of First Frost in Fall	Oct 20	Oct 15
Mean Annual Frost Free Period (Days)	170	165
Start of Growing Season	Apr 6	Apr 8
End of Growing Season	Nov 12	Nov 11
Mean Annual Length of Growing Season	220	215
Mean Annual Growing Degree-Days	4200	4100
Mean Annual Precipitation (Inches)	30	30
Avg. Rainfall Apr. 1-Sept. 30	15.5	17.0
Avg. Summer Rainfall (J.J.A.)	7.5	8.5
Mean Annual Moisture Deficiency (Inches)	5	4
Mean Annual Frequency of Drought	30	20

Sources: a) Brown, McKay and Chapman, (1980), Table 7, pg. 60.
b) Townsend and Burke, 490, p. 17.

TABLE 16

Libby's Growers (Green Peas and/or Sweet Corn) and Climatic Factors

	CLIMATIC REGIONS		
	Kent and Essex	Lake Erie	South Slopes
Mean Annual Temperature °F	48	47	45
Mean Daily Maximum Temperature °F-January	31	31	28
-April	55	53	52
-July	82	81	81
-October	61	61	59
Mean Daily Minimum Temperature °F-January	19	17	13
-April	36	35	33
-July	62	59	58
-October	43	41	39
Mean Date of Last Frost in Spring	May 5	May 12	May 15
Mean Date of First Frost in Fall	Oct 15	Oct 10	Oct 5
Mean Annual Frost Free Periods (Days)	165	150	145
Start of Growing Season	Apr 8	Apr 10	Apr 13
End of Growing Season	Nov 11	Nov 8	Nov 3
Mean Annual Length of Growing Season	215	210	205
Mean Annual Growing Degree-Days	4100	3700	3500
Mean Annual Precipitation (Inches)	30	34	30-38
Avg. Rainfall Apr. 1-Sept. 30	17.0	17.1	17.0
Avg. Summer Rainfall (J.J.A.)	8.5	8.8	8.7
Mean Annual Moisture Deficiency (Inches)	4	3	2
Mean Annual Frequency of Drought	20	20	20

Sources: a) Brown, McKay and Chapman, (1980), Table 7, p. 60.
b) Townsend and Burke, 490, p. 17.

of Kent county, the mean annual frost free periods were 150 (Lake Erie Counties) and 145 days (South Slopes); (Table 16). The range in the mean frost free period was 15 days between the Leamington climatic region and the South Slopes climatic region. The mean date of the last frost in the spring were May 1 for the Leamington climatic region, May 5 for the Essex and Kent, May 12 for the Lake Erie Counties and May 15 for the South Slopes (Tables 15, 16). The range in the mean date of the last frost in the spring was 14 days between the Leamington and the South Slopes climatic region. The mean dates of the first frost in the fall were October 20 for the Leamington climatic region, October 15 for Kent and Essex, October 10 for the Lake Erie Counties and October 5 for the South Slopes (Tables 15,16). There was a 15 day range in the mean date of the first fall frost between the Leamington and the South Slopes climatic regions. It is evident that the longest frost free seasons occur in the Leamington and Essex and Kent climatic regions of the study area.

The perennial-crop growing season is that period in an average year during which the mean daily temperature is 42°F. or higher. The perennial-crop growing season usually begins about three to five weeks earlier and ends about three to six weeks later than the average frost free period (Brown, McKay and Chapman, 1980, p. 36). Of the four climatic regions in the study area, the longer growing seasons were in the Leamington and Essex and Kent climatic regions (Tables 15, 16).

Plant growth and development not only rely on the length

of the growing season but also on the amount of heat available during the growing season. An indication of the amount of available heat is given by the seasonal accumulation of "Growing Degree-Days." The latter are defined as the number of degrees of mean daily temperature above a base of 42°F accumulated over the year. The highest number of degree-days are accumulated in the Leamington (4200 F° days) and Kent and Essex (4100 F°days) regions (Tables 15,16). The lowest heat accumulation occurs in the South Slopes (3500 F°days). The range in heat accumulation in the study area is 700 F° days (Tables 15, 16).

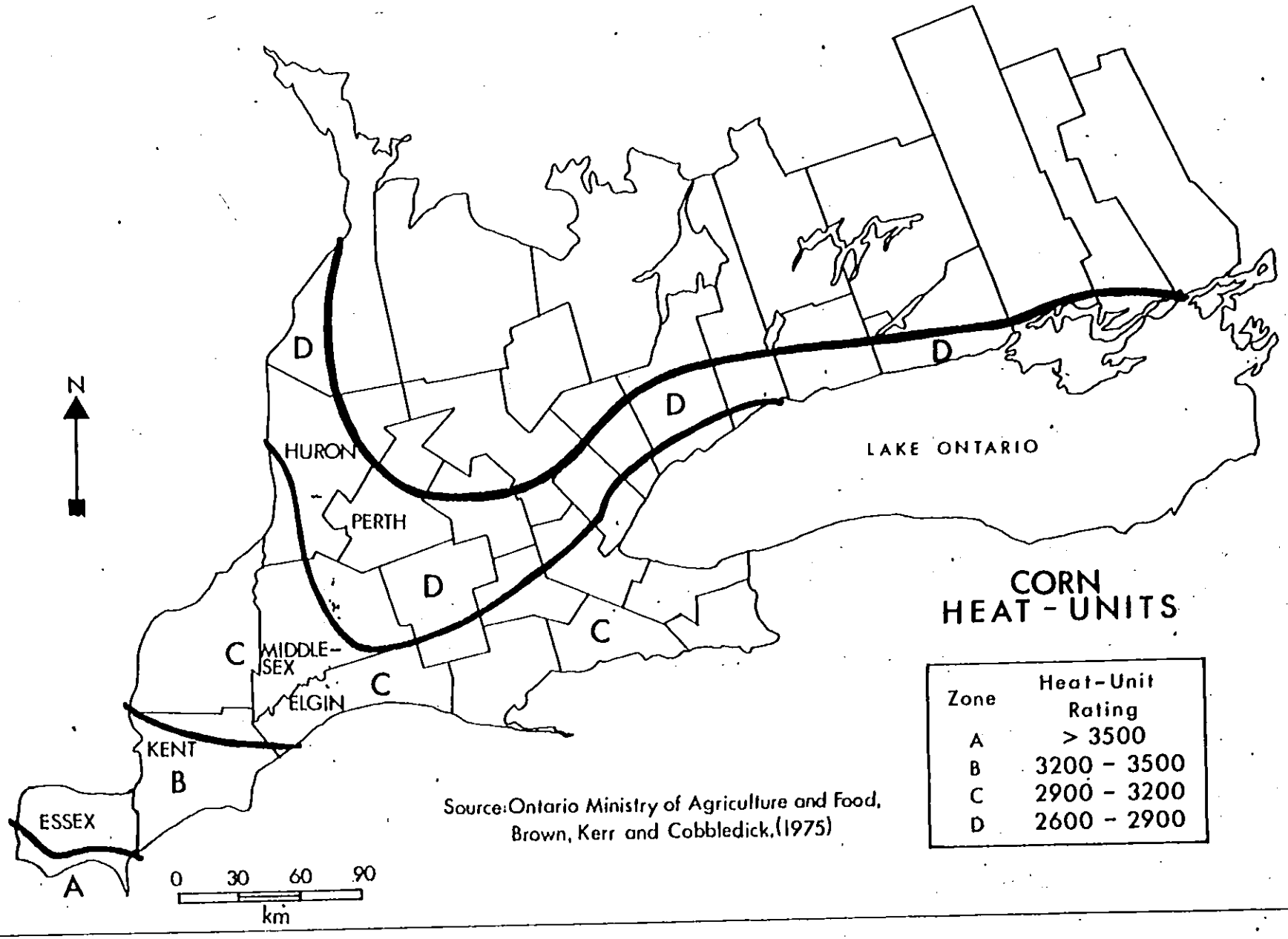
In southwestern Ontario, corn is an important field crop grown for processing, livestock feed, cereals, oils, starch and distilling. Corn is an annual crop that uses the full frost-free period to reach maturity. Sweet corn processors schedule plantings of several cultivars (varieties) to insure they will mature at regular intervals and guarantee a continuous supply of harvested crop to the processing plant.

Seed catalogues rate a sweet corn cultivar by its "days to maturity." A cultivar such as "Seneca Explorer" according to the seed company's rating takes 65 days to mature. But certain factors may cause variances in the time it takes for sweet corn to mature: (1) the temperatures during the growing season; (2) the time of year the corn is planted (corn planted in May will be slower to mature than corn planted in June); and (3) the part of the province in which the corn is planted (the warmer climate of Essex County will cause corn to mature

faster than those in other areas of the province); (Brown, Kerr and Cobbledick, 1975, p. 1). Instead of relying solely on "days to maturity," a more reliable system would be using "corn heat units" needed by a sweet corn cultivar to reach maturity. Corn heat units (CHU) are values based on the relationship between temperatures and sweet-corn development (rate of progress to maturity).

For the sweet corn growers contracted by Green Giant in the Leamington climatic region the rating is 3500 (Zone A, Map 4). The sweet corn growers contracted by Green Giant and Libby's in the Kent and Essex climatic regions, have a CHU rating of 3200 to 3500 (Zone B, Map 4). Those sweet corn growers contracted by Libby's in Lake Erie Counties climatic region have a CHU rating of 2900 to 3200 (Zone C, Map 4). The remaining Libby's sweet corn growers who are located in the South Slopes climatic region have a CHU rating of 2600 to 2900 (Zone D, Map 4). Depending on the varieties chosen and the average freeze dates that occur during the growing season, it is possible for a contracted sweet corn grower to "double crop." A grower living in the Amherstburg area contracted for sweet corn by Green Giant could plant two sweet corn cultivars such as Polarvee (1550 corn heat-units) and Earlivee (1600 corn-heat units), totalling 3150 CHU, well within the 3500 CHU rating of Zone A (Map 4). It is possible for sweet corn growers contracted by Libby's in Zones C and D to "double crop" sweet corn. It is also possible a farmer could "double crop" two different types of crop. A farmer could grow a green peas and/or sweet corn

Map 4



CORN
HEAT - UNITS

Zone	Heat-Unit Rating
A	> 3500
B	3200 - 3500
C	2900 - 3200
D	2600 - 2900

Source: Ontario Ministry of Agriculture and Food, Brown, Kerr and Cobbledick. (1975)

crop for a processor and then after the crop has been harvested grow another crop such as soybeans.

In relation to precipitation, there is no difference in the mean annual precipitation between Leamington (30 inches) and the Kent and Essex (30 inches) climatic regions but the Lake Erie Counties and the South Slopes climatic regions have a higher annual means at 34 inches and 30 to 38 inches. The mean annual precipitation in the South Slopes is high in comparison to the other climatic regions because of the influence of the winds that blow across Lake Huron onto the slopes. Except for the Leamington climatic region, there is very little difference among the other three climatic regions in average rainfall from April 1 to September 30 (Tables 15, 16). This pattern is also evident in the average summer rainfall where there is little difference among the Kent and Essex, Lake Erie Counties and South Slopes climatic regions but the average summer rainfall is distinctly lower in the Leamington Climatic region (Tables 15, 16).

The major precipitation disadvantage in the Leamington and Kent and Essex climatic regions is the mean annual moisture deficiency. Precipitation is low in both areas but also because of prevailing high summer temperatures, the moisture effectiveness of the precipitation is low even though slightly more than half of it falls during the growing season. Because of precipitation variability there is the occurrence of extended dry periods or drought. A dry period is defined as consecutive days having less than 0.1 inches of precipitation per day (Brown,

McKay and Chapman, 1980, p. 45). In the study area, lengthy dry periods of a month or more duration are rare, but short duration droughts are common. Dry periods of at least seven days duration occur, on the average, at least once a month during the growing season (Brown, McKay and Chapman, 1980, p. 45). The occurrence of extended dry periods is commonplace in the study area during the summer and early fall. For both areas, it would be more advantageous to grow early cultivars of green peas and sweet corn in order to produce good quality high yields. Since both the Leamington and Essex and Kent climatic regions are so susceptible to drought, irrigation would guarantee high quality crop yields.

CHAPTER V

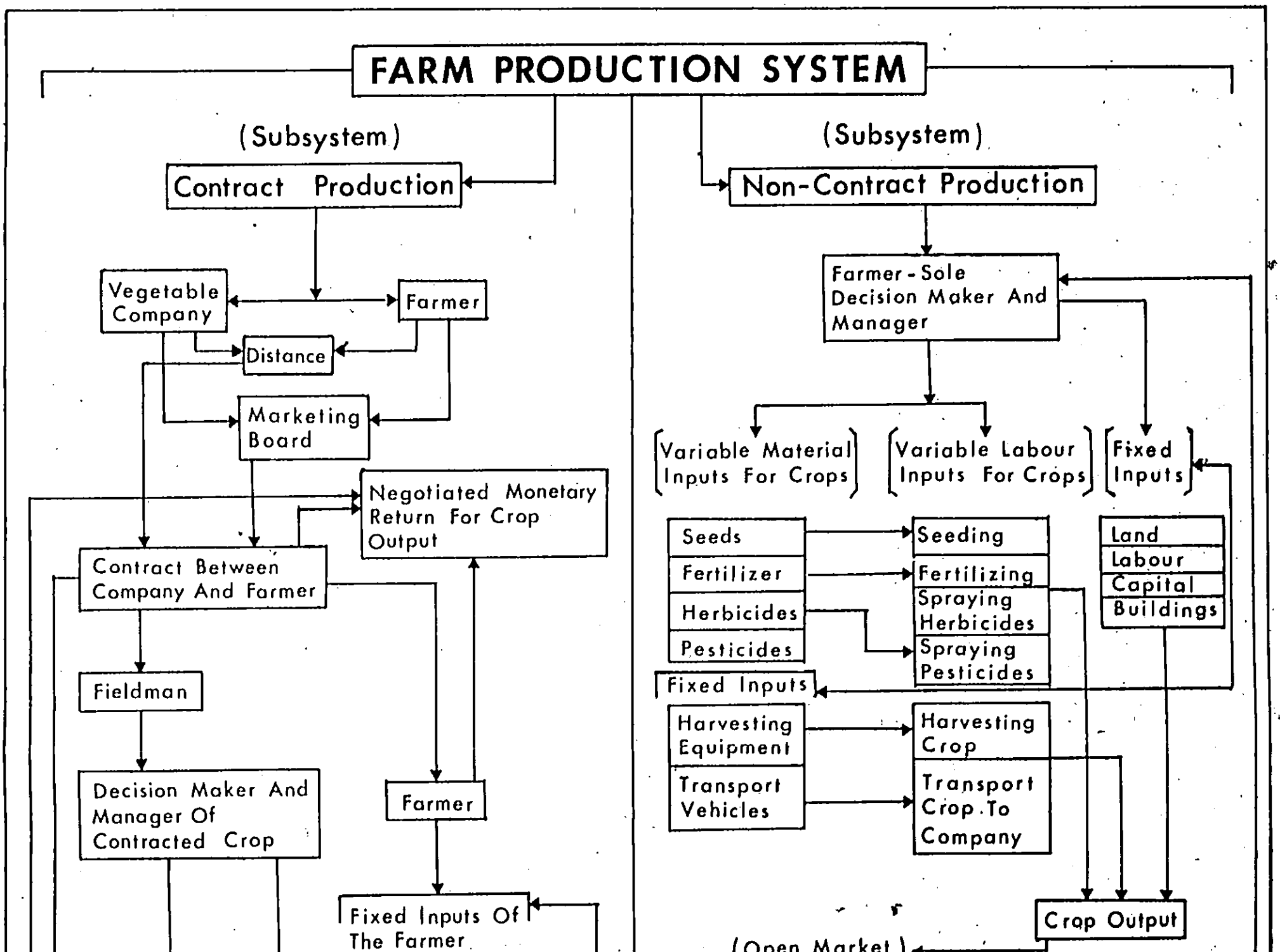
METHODOLOGY

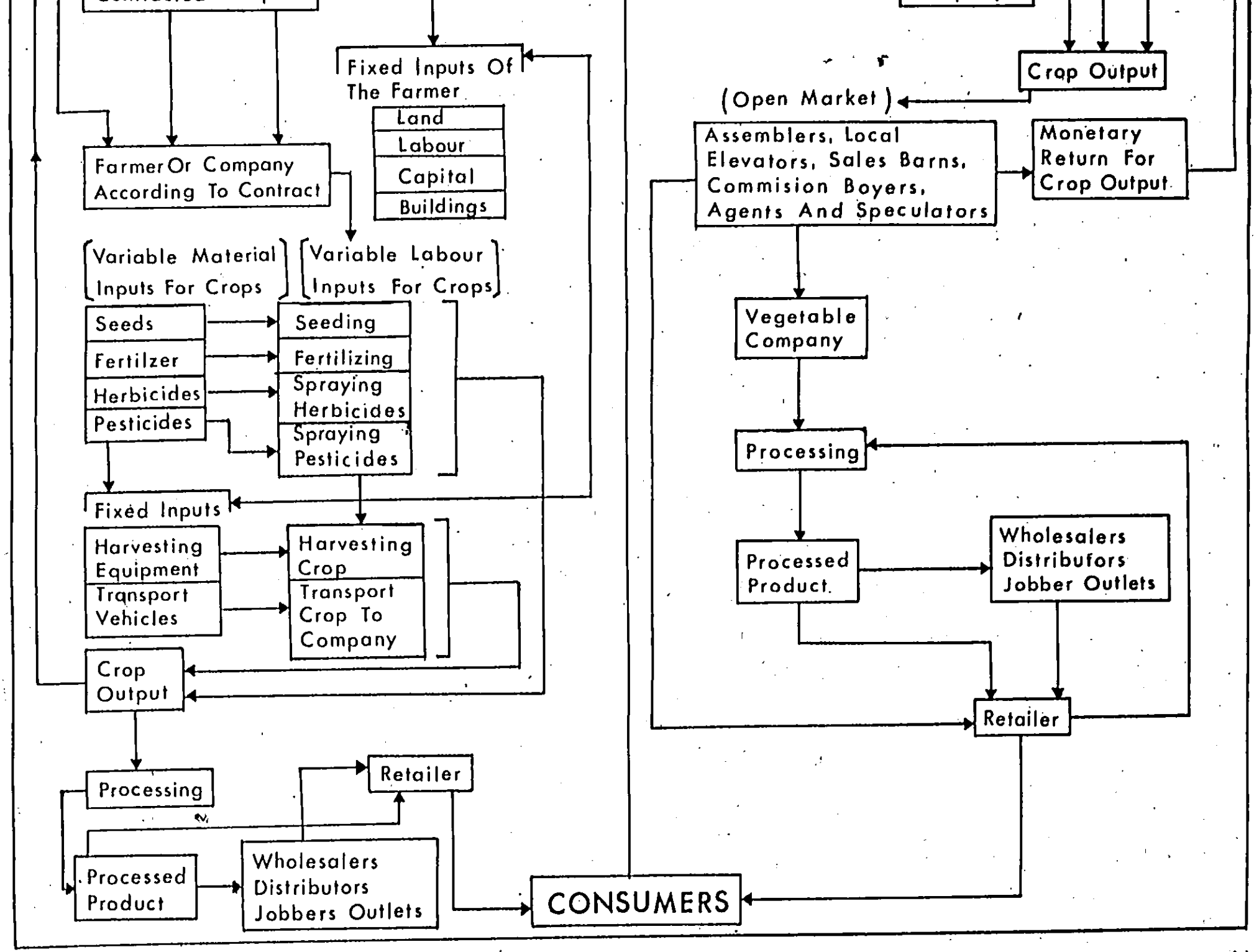
Models of Farm Production: Contract and Non-Contract

Contract farming may be better understood by comparing its organizational structure and functions with a non-contract family farm operating in a free market economy (Figure 2). In either case, the subsystem provides a framework within which a farmer makes decisions as to which crop to produce and how to produce it. Policy making decisions are strongly influenced by a farmer's personal evaluation of his needs, assessments and farming experience. When a farmer deals with daily or weekly farm operations, he makes snap judgements within the structure and functions of the subsystem (Morgan and Munton, 1971, p. 29).

In both subsystems, material and labour inputs are necessary for successful crop production. According to the vegetable crop being produced (biological aspect) and production system (economic aspect) put into effect inputs may consist of seeds, fertilizers, labour, purchases of land, machinery, vehicles, specialized equipment, buildings, fuel and power, sprays (herbicides and pesticides), repairs and maintenance.

Inputs can be classified into two groups: fixed and variable. Fixed inputs are employed in unit increments, usually with considerable capital expenditure. Their significance in production changes over time with changes in technology. Items of capital equipment such as tractors and combines, together with land, buildings, and permanent labour can be considered as


FARM PRODUCTION SYSTEM
(Subsystem)
Contract Production
Vegetable Company
Farmer
Distance
Marketing Board
Negotiated Monetary Return For Crop Output
Contract Between Company And Farmer
Fieldman
Decision Maker And Manager Of Contracted Crop
Farmer
Fixed Inputs Of The Farmer
(Subsystem)
Non-Contract Production
Farmer - Sole Decision Maker And Manager
Variable Material Inputs For Crops
Variable Labour Inputs For Crops
Fixed Inputs
Seeds
Fertilizer
Herbicides
Pesticides
Seeding
Fertilizing
Spraying Herbicides
Spraying Pesticides
Land
Labour
Capital
Buildings
Fixed Inputs
Harvesting Equipment
Transport Vehicles
Harvesting Crop
Transport Crop To Company
Crop Output
(Open Market)



Source: Author

Figure 2

fixed inputs. Variable inputs are directly related to the volume of production and may be applied in any quantity or may be used interchangeably in order to minimize costs. They include such items as seeds, fertilizers, herbicides, pesticides, and temporary labour (Morgan and Munton, 1971, p. 25).

An integral part of input analysis is farm management of various labour oriented operations such as the planting of seeds, applications of fertilizer, spraying herbicides and pesticides, harvesting the vegetable crop and transporting the vegetable crop output to the buyer. Farm management must make sure that all inputs are in proper sequence and in coordination with seasonal rhythms and market forces.

In both production subsystems, there are four major parties with specific goals. The farmer attempts to produce a high quality vegetable crop and sell it to a prospective buyer offering a price that will meet his main objectives of profit maximization and financial security. The vegetable processing company wants to procure high quality vegetables in large enough quantity to meet its processing needs and market potential. To guarantee this, vegetable processors establish contracts with growers who are located within a certain distance of the processing plant. Supermarket chains require a variety of high quality processed vegetables in adequate volume to maintain or increase their share of the market. Finally the consumer wants to choose from a variety of high quality processed vegetable products at reasonable prices.

The key differences existing between both subsystems are:

(1) The party making decisions that are directly influenced by distance and its effect on cost; (2) The party delegated as being the manager and decision-maker of all operations necessary for vegetable crop production; (3) The party providing the inputs (fixed and variable); (4) The party or parties involved in the marketing of the crop enterprise output; and (5) The actual time when the farmer receives payment for the vegetable crop output.

Distance is a leading factor directly influencing the decision of the processor as to which growers to contract. To insure quality and keep costs at a minimum the processing company establishes contracts with farmers located within a certain distance. The distance factor in relation to establishing contracts with prospective farmer-producers will vary according to the type of crop being grown and the need for certain quantities of a crop to meet the needs and the market potential of the processor. In the non-contract subsystem, the farmer makes all the decisions pertaining to distance and must bear all distance costs affecting any particular crop enterprise.

In contract production, the fieldman as a representative of the company is the major liaison between the processing company and the farmer (grower). He is the chief manager and decision-maker responsible for all organizational decisions (variable material and labour inputs) related to the contracted crop. For the vegetable processing company the fieldman insures that all conditions of the contract are carried out for successful production of a high quality vegetable crop. The farmer who

works under the direction of the fieldman is the primary source of labour input for the contracted vegetable crop. This concession by the farmer to relinquish management and decision-making pertains only to the contracted crop enterprise and does not include management and decision-making concessions involving other production enterprises within the farm unit.

In the non-contract subsystem, the individual farmer is the sole decision maker and manager of all operations needed for vegetable crop production. He is responsible for all organizational decisions (variable material and labour inputs) necessary for vegetable production.

Various vegetable crops require different contract treatment. The provision of fixed inputs such as land, capital, and buildings by a company occurs only in certain situations. Most vegetable processing companies assist the farmer to some degree in the provision and application of some fixed inputs (special harvesting machines, sprayers, transport equipment) and the provision of variable material and labour inputs. Conditions concerning the availability of fixed and variable material and labour inputs are usually stipulated in the contract at a certain fee. The type, scale, and intensity of inputs by a specific vegetable processing company will vary according to the crop under contract and the ability or inability of the farmer to provide variable material and labour inputs denoting the economic and technological capability and efficiency of his farm unit and operations.

In the non-contract subsystem the farmer, in order to

maintain or upgrade operations for vegetable crop production, provides all the inputs (both fixed and variable material and labour). He is also the chief source of labour and labour organizer for utilizing family members and hired help (permanent and temporary) to assist in the application of variable material inputs.

By contracting, a farmer can avoid the marketing problems that may materialize in the non-contract production subsystem. In the contract subsystem the farmer has a prearranged market (the processor) and payment for the vegetable crop enterprise even before it has actually been planted and harvested.

In non-contract production, there is often a great degree of uncertainty in relation to marketing of the vegetable crop enterprise output. Until the vegetable crop is sold, the farmer does not know who the buyer is and what the payment will be for the vegetable crop output. Risk bearing costs are associated with ownership and it includes the assumption of both physical and market risk (Snodgrass and Wallace, 1975, p. 164). If a farmer wants to transfer the risk of ownership, he can always accomplish this by selling the crop to an agent or speculator. The farmer can acquire the services of brokers and commission men to provide market information for effective bargaining with buyers. Although there is greater financial risk in non-contracting there is always the possibility that prices for certain vegetable crops on the open market will be higher in comparison to negotiated contract prices. For the farmer, there is the choice between financial security (contracting)

versus financial risk (non-contracting) and the possibility of greater financial returns (non-contracting).

In contracting the farmer will receive payment for the vegetable crop after it has been delivered to the processing plant. But in non contracting a farmer sometimes has difficulty finding a buyer in the open market. He may have to wait for quite some time before finding a buyer and receiving payment for the harvested vegetable crop.

Profile of The Contract Growers and Their Farming Operations

The first part of the analysis will be descriptive in character (frequencies and percentages) based on the data from the questionnaire (Appendix 2B). This part of the analysis will provide insight into the extent of contracting that each farmer is involved in: companies contracted with, type of contract crops grown, contract crops in tons and their sale in tons. Questions dealing with sub quality crop disposal, surplus crop disposal, provision of inputs (materials and equipment, various tasks) will specify who (grower or company) is responsible for what according to the contractual agreement. Distance as a factor in the contractual relationship is considered in both miles and minutes. Questions pertaining to the raising of non-contract crops (type and acreage) and livestock will denote if the farmers are not just involved in contracting crops but in other farming activities. Queries are made about the utilization of tile drainage and crop rotation because both of these practices can affect contract crop quality. Crop insurance is important because it compensates for losses. Questions in reference to

farming experience, the immediate family and their labour input, the hiring of outside help and their labour input, age, level of education, education directly related to agriculture, income status (off-farm, contract and non-contract) will provide socio-economic information about the contract growers and their farming operation. Questions about contracting and its effect on income and the advantages or disadvantages of contracting will gauge directly the overall influence contracting has had on each individual contracted grower and his farming operation.

Hypotheses and The Rationale

(A) Hypotheses relating to distance (miles) between the processor and the contracted growers.

1. There is no correlation between distance and contracted acreage-economies of scale for Green Giant a) green peas growers, b) sweet corn growers and Libby's c) green peas growers and d) sweet corn growers.
2. There is no correlation between distance and the number of tasks* provided by Green Giant for their a) contracted green peas growers, b) contracted sweet corn growers and Libby's c) contracted green peas growers and d) contracted sweet corn growers.

The importance of distance in raw product procurement for fruit and vegetable processing was studied in the United States by the National Commission of Food Marketing (1966). It was found that in all regions of the United States except for

*The number of tasks under consideration were six which included: the seeding, the fertilizing, the spraying of herbicides, the spraying of pesticides, the harvesting of the crop and the transportation of the harvested vegetable crop to the company.

the Pacific region, more than three-fourths of the raw products utilized were secured within a 50 mile radius of the processing plant (National Commission of Food Marketing, 1966, p. 190). Ray (1963), Helmberger and Hoos (1966), Kohls (1967), and Capstick (1970) also emphasize that close proximity of the raw product supply to the processor is vital in keeping procurement costs for the vegetable processor at a minimum.

According to Blake Clarke of Green Giant (Interview, November 13, 1981) the growing processing system for green peas and sweet corn must remain as compact as possible in relation to distance. For Green Giant, distance was the fundamental factor in the establishment of 1981 contracts because after 40 miles from the Tecumseh processing plant costs escalate (Blake Clarke, Green Giant, November 1981). High transportation costs must be avoided.

For Libby's in Wallaceburg in 1981, the policy was to generally get all crops within a 20 mile radius of the processing plant (Ron Hall, Libby's, May 4, 1982). But the situation concerning sweet corn contracts for 1981 was an exception in relation to the 20 mile radius. In 1981, contracts for sweet corn were established outside the 20 mile radius because of higher prices being offered by other companies in Kent County for field corn and seed corn. Although this situation transpired in 1981, in 1982 all sweet corn will be contracted within the 20 mile radius (Ron Hall, Libby's, May 4, 1982).

Green Giant and Libby's establish a specific radial distance as criteria for establishing green peas and sweet corn

contracts. It is apparent both companies process the same vegetable commodities (green peas and sweet corn) but the distance criterion for establishing contracts is different. Since these contract boundaries exist, one would assume that costs transpiring within these set boundaries would be of very little importance to Green Giant in relation to green peas and sweet corn production and for Libby's regarding green peas contract production. Even though Libby's contracted for sweet corn outside the 20 mile contract boundary in 1981, economies of scale was not a fundamental factor in the establishment of contracts. According to Libby's procurement policies this situation was an anomaly and Libby's found it necessary to bear the costs for long distance commodity procurement because as a major processor it cannot afford to lose its share of the processed sweet corn market.

Pertaining to the provision of tasks (labour inputs) within the contract boundaries of both companies, distance would have no influence over the number of tasks provided by the company. Costs that may occur because of the number of inputs provided by the company for individual contract growers would not be greatly predisposed by distance. Thus there would be no relationship between distance and the number of tasks for Green Giant contracted green peas growers, contracted sweet corn growers and Libby's contracted green peas growers. Even though Libby's contracted for sweet corn with farmers beyond the 20 mile contract boundary, the number of tasks (labour inputs) provided by the company would not be influenced by distance.

Where labour inputs are needed, Libby's will provide them because the company needs adequate supplies of high quality sweet corn to fulfill their processing needs (Mueller and Collins, 1957; Penn, 1958; Leckie, 1958 and 1959; Smith and Christian, 1961; Vatter, 1961; Roy, 1963; Sorenson, 1964; Breimyer, 1965; Helmberger and Hoos, 1966; The U.S. National Commission on Food Marketing, 1966; et al.).

(B) Hypotheses relating to contracted acreage and inputs.

3. There is a negative correlation between contracted acreage and the number of material inputs* for Green Giant a) green peas growers, b) sweet corn growers and Libby's c) green peas growers, d) sweet corn growers.

4. There is a negative correlation between contracted acreage and the number of tasks (labour inputs) for Green Giant a) green peas growers, b) sweet corn growers and Libby's c) green peas growers, d) sweet corn growers.

To Davis (1957), Mighell (1957), Seagraves and Bishop (1958), Leckie (1958), Wood (1962), Roy (1963), Seaver (1964) and Padberg (1966) farm operators of small units (size of farm operations) lack the size, capital and managerial capacity to take advantage of new technologies and thus increase efficiency of the farm operations. Because of the supposed inadequacies of smaller farm operations one would tend to assume that growers with small farms would contract for smaller acreages but the number of inputs (material and equipment, tasks) provided

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*The number of material and equipment inputs under consideration were six which included: seeds, fertilizer, herbicides, pesticides, harvesting equipment and equipment to transport the harvested crop to the company.

by the processor would be greater in comparison to the number of inputs (material and equipment, tasks) available to growers-operators of larger farms. Operators of larger farms would contract for more acres and would be able to provide some of their own inputs thus inputs by the processors for larger acreages would be less in number. They have the ability to contract for larger acreages and provide more inputs (material and equipment, tasks) in comparison to small farm operators.

C) Hypothesis relating to contracting experience (years) and size of contracted acreage.

5. There is a significant relationship between contracting experience (years) of the grower and the size of contracted acreage.

Although there has been some research on age and contracting Leckie (1959), Miller (1960) there has been very little work on farming experience of the contracted grower and how this may influence certain conditions of the contract such as the agreed acreage between the grower and the processor. A recent study by Pidgeon (1984) on contract cabbage farming in Kent County revealed that there was a relationship between experience in growing cabbage and the size of contract: the greater the number of consecutive years contracted with Libby's, the greater the contracted acreage. It would seem logical that if a farmer had experience in contract growing of a particular vegetable, a company processing that particular vegetable would contract for larger acreage with him in comparison to a grower who has no experience contract growing that certain vegetable.

If this is the case, then those contract growers with past contracting experience in vegetables, especially green peas and sweet corn, should have larger acreages contracted with Green Giant and Libby's in comparison to those with lesser contracting experience.

Data Source and Collection Procedure

The principal source of data for this study was based on a multi-staged mail questionnaire survey of 1981 green peas and sweet corn growers contracted by Green Giant in Tecumseh, Essex County and Libby McNeill and Libby (Libby's) in Wallaceburg, Kent County. Lists of 1981 contracted green peas and/or sweet corn growers were obtained from the two vegetable processor which included the names and addresses of the contract growers.

The multi-staged mail survey utilized for data collection generally followed the method described by Buse (1973) which was used in the "Wisconsin Incorporated Farm Study." The Wisconsin Incorporated Farm Study was based on a 5 stage survey with each stage designed to attract the attention of the respondent and get them interested enough so they would complete the questionnaire. According to Buse, the multi-staged mail survey was very successful because it was responsible for a 91 percent response rate and only 83 out of 880 (9 percent) were classified as non respondents.

The mailings for the survey were made as follows: Stage 1, Advance mailing-introductory letter (Appendix 2A); Stage 2, The questionnaire (Appendix 2B); Stage 3, A follow-up letter

(Appendix 2C); Stage 4, a second follow-up questionnaire (Appendix 2D)*; and Stage 5, a final follow-up letter (the letter substituted the final telephone follow-up described by Buse; Appendix 2E).

For this study, the mail survey was considered to be the best method for obtaining the needed data because of its low cost and geographic flexibility. The possibility of a low response rate, usually characteristic of mail surveys, was worrysome, for low returns could reduce the validity and reliability of the results. As it turned out, the multi-staged survey with follow-ups, modelled on the "Wisconsin Incorporated Farm Study" resulted in a good response rate (56.4 percent).

Verification Procedure

For the descriptive profile of the contract growers for Green Giant and Libby's absolute frequencies, relative frequencies and means were used. To test the hypotheses 2 types of non-parametric statistical tests, Kendall Tau and Chi-Square were used. The statistical significance is determined at the .05 level.

Kendall Tau rank correlation was used to determine if there is a correlation between two ordinal scale variables the (y) dependent variable and the (x) independent variable (LaValle, p. 210). In relation to the hypotheses formulated the (y) dependent and (x) independent variables were contracted

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*The second follow-up questionnaire Stage 4, Appendix 2D, was the same one used in Stage 2, Appendix 2B.

acreage and distance, the number of tasks and distance, the number of material inputs and contracted acreage and the number of labour inputs and contracted acreage. After Tau was calculated,* the hypotheses were evaluated by comparing Z_o with Z_c to determine if correlations exist between x and y variables. For the final hypothesis Chi-Square was employed to determine if there is a significant relationship in between contracting experience and contracted acreage.

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*Refer to Appendix 3A for steps necessary to calculate Kendall Tau.

CHAPTER VI

ANALYSIS

This chapter consists of three parts. The first part describes the response rate to the questionnaire; the second provides a profile of contract farming; the third tests and evaluates my hypotheses about contract farming.

Questionnaire Response Rate

Green Giant had contracted 107 farmers in 1981, of whom 57 (53.3 percent) responded to the questionnaire (Table 17). In relation to the contract crop, 22 of the 40 green peas growers (55.0 percent) 16 of the 26 sweet corn growers (61.5 percent); but only 19 of the 41 sweet corn and green peas growers (46.3 percent) responded to the questionnaire (Map 5).

Libby's had contracted 111 farmers in 1981, of whom 66 (59.4 percent) responded to the questionnaire survey (Table 17). By type of contracted crop grown, 16 of the 28 green peas growers (57.1 percent), 45 of the 76 sweet corn growers (59.2 percent) and 5 of 7 sweet corn and green peas growers (71.4 percent) responded (Map 5).

The combined response rate for both companies showed that of the 218 contracted farmers, 123 (56.4 percent) responded to the questionnaire (Table 17). By contracted crop the response rate was 38 of 68 (55.8 percent) for the green peas growers, 61 of 102 (59.8 percent) for sweet corn growers and 24 of 48 (50.0 percent) for those growing both green peas and sweet corn. For the purpose of this analysis, the sample

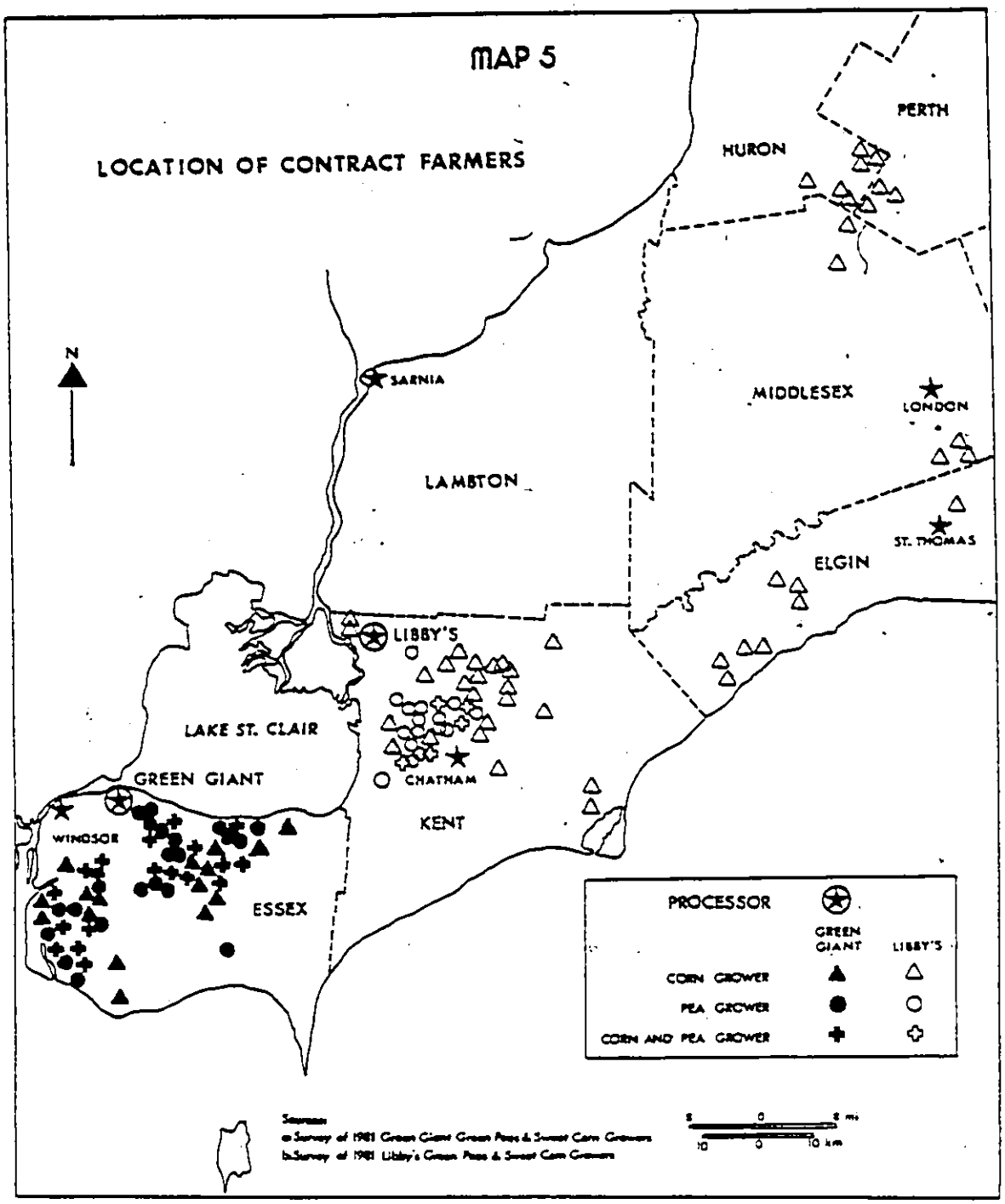

MAP 5
LOCATION OF CONTRACT FARMERS
PERTH
HURON
N
SARNIA
MIDDLESEX
LONDON
LAMBTON
ST. THOMAS
ELGIN
LIBBY'S
LAKE ST. CLAIR
GREEN GIANT
CHATHAM
KENT
WINDSOR
ESSEX
PROCESSOR
GREEN GIANT
LIBBY'S
CORN GROWER
PEA GROWER
CORN AND PEA GROWER
Sources
a-Survey of 1981 Green Giant Green Peas & Sweet Corn Growers
b-Survey of 1981 Libby's Green Peas & Sweet Corn Growers
0
5 mi
10
0
10 km

TABLE 17

Survey Response By Company And Contracted Crop

Type of Crop	No. of Farmers Contracted		No. of Respondents		Percentage Response		Green Giant and Libby's: No. of Farmers Contracted	Green Giant and Libby's: No. of Respondents	Green Giant and Libby's: Percentage Response
	GG.(a)	LIB.(b)	GG.	LIB.	GG.	LIB.			
a) Green Peas	40	28	22	16	55.0	57.1	68	38	55.8
b) Sweet Corn	26	76	16	45	61.5	59.2	102	61	59.8
c) Both Green Peas and Sweet Corn	41	7	19	5	46.3	71.4	48	24	50.0
Total	107	111	57	66	53.3	59.4	218	123	56.4

GG.-Green Giant LIB.-Libby's

Sources: (a) Green Giant 1981 Green Peas and Sweet Corn Growers Lists.
(b) Libby's 1981 Green Peas and Sweet Corn Growers Lits.

size was adequate and relatively unbiased.

The growers who responded to the questionnaire form a significant sample of all green peas and sweet corn growers in Southwestern Ontario in 1981. Since all respondents contracted with Green Giant were located in Essex County (Table 18), the 41 green peas growers who responded represented 46.1 percent of all the 89 green peas growers in Essex County in 1981. The 35 sweet corn growers who responded represented 20.5 percent of all the 171 sweet corn growers in Essex County in 1981.

All the green peas growers contracted with Libby's were located in Kent County. The 21 contracted green peas growers represented 19.1 percent of the green peas growers in Kent County in 1981 (Table 18). Sweet corn growers contracted with Libby's were located in Kent, Elgin, Middlesex, Huron, and Perth counties. The 50 contracted sweet corn growers who responded were 12.1 percent of the 414 sweet corn growers in those counties in 1981 (Table 18).

In relation to all farm operators in each county, the 57 respondents contracted by Green Giant represented 1.6 percent of all the farmers in Essex County. Respondents contracted with Libby's in Kent, Elgin, Middlesex, Huron and Perth counties represented the following percentages: 1.34 percent (44 of 3,264), 0.37 percent (8 of 2,157), 0.14 percent (5 of 3,548), 0.16 percent (5 of 3,112) and 0.11 percent (4 of 3,718); (Statistics Canada, 1978).

Henceforth all data will relate to the sample of responses obtained from the farmers contracted with Green Giant

TABLE 18

Respondents Contracted With The Two Companies In Comparison To All Green Pea And Sweet Corn Growers In Certain Counties

Type of Crop	County/ Counties	No. of Growers In 1981*	No. of Respondents	Respondents Percentage of 1981 Growers
		Green Giant		
Green Peas	Essex	89	41	46.1
Sweet Corn	Essex	171	35	20.5
		Libby's		
Green Peas	Kent	110	21	19.1
Sweet Corn	Kent	108	50	12.1
	Elgin	65		
	Middlesex	138		
	Huron	70		
	Perth	33		
	Total	414		

*Source: Ontario Ministry of Agriculture, Economics Branch (1981), pp. 82, 83, 93, 101 and 110.

and Libby's.

A Profile of Contract Farming

Contracted Acreage in Green Peas and Sweet Corn

Of the 57 responding farmers who contracted with Green Giant in 1981 (Table 19), 41 (71.9 percent) identified themselves as green peas growers (refer to Table 17, no. of respondents: 22+19). Contracts in green peas ranged from 10 to more than 70 acres, but the majority were contracted for 20 to 29 acres of the crop (Table 19). Since more growers were contracted for smaller rather than larger acreages, the mean in 1981 was 33.3 acres. Of the 57 respondents who were contracted by Green Giant for green peas in 1981, 35 were also contracted in 1980. The contracted acreages for 1980 were similar to those of 1981. Contracts also ranged from 10 to more than 70 acres but most of the growers were in two ranges 10 to 19 acres (10 growers, 28.6 percent) and 20 to 29 acres (13 growers, 37.1 percent), resulting in a lower 1980 mean of 30.0 acres. No growers were contracted for less than 10 acres, and large acreages were also rare, resulting in a gap in the 60 to 69 acre range.

Thirty-five (61.4 percent) of the 57 responding farmers who contracted with Green Giant in 1981 were growers of sweet corn (Table 20; refer to Table 17, no. of respondents: 16+19). Twenty-one growers (60.0 percent) had acreages ranging from 20 to 29 acres, but the skewed distribution produced a mean of 30.3 acres. Twenty-eight (49.1 percent) of the 57 respondents

TABLE 19

Green Giant - Green Peas

Contracted	1981 No. of Farmers	1981 Percentage of Total	Of Those Contracted In 1981, Also Contracted In 1980 No. of Farmers
Green Peas	41	71.9	35
Other	16	28.1	
Total	57	100.0	

Green Peas (Acres)	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-9	0	0.0	0	0.0
10-19	5	12.2	10	28.6
20-29	21	51.2	13	37.1
30-39	4	9.8	3	8.6
40-49	2	4.9	4	11.4
50-59	4	9.8	2	5.7
60-69	0	0.0	0	0.0
70 +	5	12.1	3	8.6
Total	41	100.0	35	100.0
	Mean Contracted Acreage=33.3 Acres		Mean Contracted Acreage=30.0 Acres	

Source: Questionnaire.

TABLE 20

Green Giant - Sweet Corn

Contracted	1981 No. of Farmers	1981 Percentage of Total	Of Those Contracted in 1981, Also Contracted in 1980. No. of Farmers
Sweet Corn	35	61.4	28
Other	22	38.6	
Total	57	100.0	

Sweet Corn (Acres)	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-9	0	0.0	0	0.0
10-19	1	2.8	1	3.6
20-29	21	60.0	11	39.3
30-39	5	14.3	6	21.4
40-49	5	14.3	4	14.3
50-59	2	5.7	1	3.6
60-69	1	2.8	2	7.1
70 +	0	0.0	3	10.7
Total	35	100.0	28	100.0
	Mean Contracted Acreage =30.3 Acres		Mean Contracted Acreage =39.4 Acres	

Source: Questionnaire

had also been contracted for sweet corn in 1980 (Table 20). The largest number of growers (11 of 28 or 39.3 percent) had acreages ranging from 20 to 29 acres, a proportionately larger number of farmers in the higher acreage contracts, however, resulted in a higher mean of 39.4 acres in 1980. Again there were no growers contracted for less than 10 acres of sweet corn.

Twenty-one (31.8 percent) of the 66 respondents contracted with Libby's in 1981 were growers of green peas (Table 21; refer to Table 17, no. of respondents: 16+5). Nine of 21 (42.9 percent) were contracted for green peas ranging from 10 to 19 acres and 7 growers (33.3 percent) were in the 20 to 29 acre range. There were no contracted growers in the 0 to 9, 50 to 59, and 60 to 69 acreage ranges. The mean contracted acreage for green peas in 1981 was 25.2 acres. Of the respondents, the same number of pea growers were also contracted in 1980 (Table 21). More growers (13 of 21 or 61.9 percent) were contracted for 10 to 19 acres of the crop in 1980, but only 5 growers (23.8 percent) were in the 20 to 29 acreage range. No growers were in the 0 to 9, 50 to 59, and 60 to 69 acreage ranges. The mean contract for 1980, smaller than for 1981, was 21.8 acres of green peas.

Of the 66 respondents who contracted with Libby's in 1981, 50 (75.8 percent) were growers of sweet corn (Table 22; refer to Table 17, no. of respondents: 45+5). Thirteen growers (26.0 percent) were contracted for acreages ranging from 20 to 29 acres and another 13 growers (26.0 percent) were in

TABLE 21

Libby's - Green Peas

Contracted	1981 No. of Farmers	1981 Percentage of Total	Of Those Contracted In 1981, Also Contracted In 1980. No. of Farmers
Green Peas	21	31.8	21
Other	45	68.2	
Total	66	100.0	

Green Peas (Acres)	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-9	0	0.0	0	0.0
10-19	9	42.9	13	61.9
20-29	7	33.3	5	23.8
30-39	3	14.3	1	4.8
40-49	1	4.8	1	4.8
50-59	0	0.0	0	0.0
60-60	0	0.0	0	0.0
70 +	1	4.8	1	4.8
Total	21	100.0	21	100.0
	Mean Contracted Acreage =25.2 Acres		Mean Contracted Acreage =21.8 Acres	

Source: Questionnaire

the 30 to 39 acre range. No growers were contracted in the 0 to 9 and 60 to 69 acre ranges. The mean contracted acreage for sweet corn was 41.4 acres. Of the 66 growers contracted in 1981, 22 were also contracted for sweet corn in 1980 (Table 22). Eleven growers (50.0 percent) were in the 20 to 39 acre range and the other 11 growers (50.0 percent) in the 50 to over 70 acre range. There were no growers in the 0 to 9, 10 to 19, and 40 to 49 acre ranges. The mean contract in 1980 for those growers, higher than the following year, was 48.5 acres.

For both companies some similarities were evident. No contracts were made for less than 10 acres for either green peas or sweet corn. This suggests that the initial costs of paperwork and basic inputs do not justify contracts with growers for less than 10 acres of crops. There were some differences, too. Whereas the mean contracts for both green peas and sweet corn with Green Giant ranged between 30 and 40 acres, the mean contracts with Libby's were smaller for green peas and larger for sweet corn.

Land Use, Farm Size And Farm Operations

Contracted crops occupied over one-quarter of the cropland the contract farmers had (Table 23). Contracted green peas and/or sweet corn occupied, on the average, 29.2 percent of the total crop acreage among the Green Giant growers, and 28.2 percent of the total crop acreage among the Libby's growers. For the majority of both the Green Giant growers (39 of 56 or 69.6 percent) and Libby's growers (39 of 60 or 60.0 percent) contracted crops comprised less than 30% of the total

TABLE 22

Libby's - Sweet Corn

Contracted	1981 No. of Farmers	1981 Percentage of Total	Of Those Contracted in 1981, Also Contracted in 1980. No. of Farmers
Sweet Corn	50	75.8	22
Other	16	24.2	
Total	66	100.0	

Sweet Corn (Acres)	No. of Farmers	Percentage Of Total	No. of Farmers	Percentage of Total
0-9	0	0.0	0	0.0
10-19	1	2.0	0	0.0
20-29	13	26.0	8	36.4
30-39	13	26.0	3	13.6
40-49	8	16.0	0	0.0
50-59	9	18.0	6	27.3
60-69	0	0.0	1	4.5
70 +	6	12.0	4	18.2
Total	50	100.0	22	100.0

Mean Contracted Acreage =41.4 Acres

Mean Contracted Acreage =48.5 Acres

Source: Questionnaire

TABLE 23

Contracted Sweet Corn And/Or Green Peas Acreage As Percentage Of Total Crop Acreage On The Farm (Contract And Non-Contract)

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	56	98.2	65	98.5
No. Response	1	1.8	1	1.5
	57	100.0	66	100.0

Percentage of Total Crop Acreage	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-10%	16	28.6	17	25.8
11-20%	13	23.2	21	31.8
21-30%	14	25.0	5	7.6
31-40%	3	5.4	9	13.6
41-50%	0	0.0	5	7.6
51-60%	2	3.6	1	1.5
61-70%	0	0.0	3	4.5
71-80%	1	1.8	0	0.0
81-90%	2	3.6	0	0.0
91-100%	5	8.9	5	7.6
Total	56	100.0	66	100.0
	Mean Percentage=29.2		Mean Percentage=28.2	

Source: Questionnaire

TABLE 24

All Contracted Crops Acreage As Percentage of Total (Contract And Non-Concract) Crop Acreage

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	56	98.2	65	98.5
No Response	1	1.8	1	1.5
	57	100.0	66	100.0

Percentage of Total Crop Acreage	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-10%	15	26.8	8	12.3
11-20%	12	21.4	23	35.4
21-30%	12	21.4	8	12.3
31-40%	6	10.7	10	15.4
41-50%	3	5.4	5	7.7
51-60%	2	3.6	1	1.5
61-70%	0	0.0	1	1.5
71-80%	0	0.0	1	1.5
81-90%	1	1.8	0	0.0
91-100%	5	8.9	8	12.3
Total	56	100.0	65	100.0
	Mean Percentage=29.4		Mean Percentage=32.5	

Source: Questionnaire

TABLE 25

All Non-Contracted Crops Acreage As Percentage of Total (Contract And Non-Contract) Crop Acreage

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	51	89.5	56	84.8
No Response	6	10.5	10	15.2
Total	57	100.0	66	100.0

Percentage of Farm Acreage	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-10%	1	2.0	0	0.0
11-20%	0	0.0	0	0.0
21-30%	0	0.0	3	5.4
31-40%	2	3.9	3	5.4
41-50%	1	2.0	2	3.6
51-60%	4	7.8	8	14.3
61-70%	7	13.7	6	10.7
71-80%	10	19.6	15	26.8
81-90%	13	25.5	15	26.8
91-100%	13	25.5	4	7.1
Total	51	100.0	56	100.0
	Mean Percentage=76.7		Mean Percentage=74.5	

Source: Questionnaire

crop acreage. There was less similarity between the growers for Green Giant and Libby's when all contract crops were considered. Whereas all contracted crops represented an almost undistinguishably larger mean (29.4 percent) of the total crop acreage among the growers for Green Giant, they constituted a notably larger one (32.5 percent) among the growers for Libby's (Table 24).

Conversely, about three-quarters of the crop acreage of the green peas and/or sweet corn growers contracted with Green Giant (76.7 percent) and Libby's (74.5 percent) consisted of non-contract crops (Table 25). Indeed, most of the farmers contracted by Green Giant (48 or 84.2 percent) and Libby's (55 or 83.3 percent) also grew non-contract crops. The majority of Green Giant respondents grew wheat (43 of 48 or 89.6 percent), soybeans (38 of 48 or 79.2 percent), and corn (32 of 48 or 66.7 percent). Other non-contract crops grown were oats, beans, hay, green peas, barley, cucumbers, sweet corn, market vegetables and onions (Table 26). The order of importance of specific non-contract crops among the farmers contracted with Libby's was somewhat different (Table 27). Farmers contracted by Libby's grew primarily corn (48 of 55 or 87.3 percent), soybeans (36 of 55 or 65.5 percent) and wheat (36 of 55 or 65.6 percent). A significant number grew beans (19 of 55 or 34.5 percent) and smaller numbers of farmers also grew barley, hay, tobacco, tomatoes, asparagus, and oats.

Land uses among contract growers for Green Giant and Libby's varied considerably. Although nearly 88 percent of all

TABLE 26

Green Giant Growers; 1981 Non-Contract Crops

Non-Contract	No. of Farmers	Percentage of Total
Response	48	84.2
No Response	9	15.8
Total	57	100.0

Type of Non-Contract Crop	No. of Farmers	Percentage of Those Responding	Mean Acreage (Acres)
Wheat	43	89.6	92.1
Soybeans	38	79.2	161.2
Corn	32	66.7	90.5
Oats	7	14.6	15.3
Beans	7	14.6	101.7
Hay	5	10.4	12.0
Green Peas	2	4.2	20.0
Barley	1	2.1	20.0
Cucumbers	1	2.1	6.0
Sweet Corn	1	2.1	5.0
Market Vegetables	1	2.1	5.0
Onions	1	2.1	1.0

Source: Questionnaire.

TABLE 27

Libby's Growers; 1981 Non-Contract Crops

Non-Contract	No. of Farmers	Percentage of Total
Response	55	83.3
No Response	11	16.7
Total	66	100.0

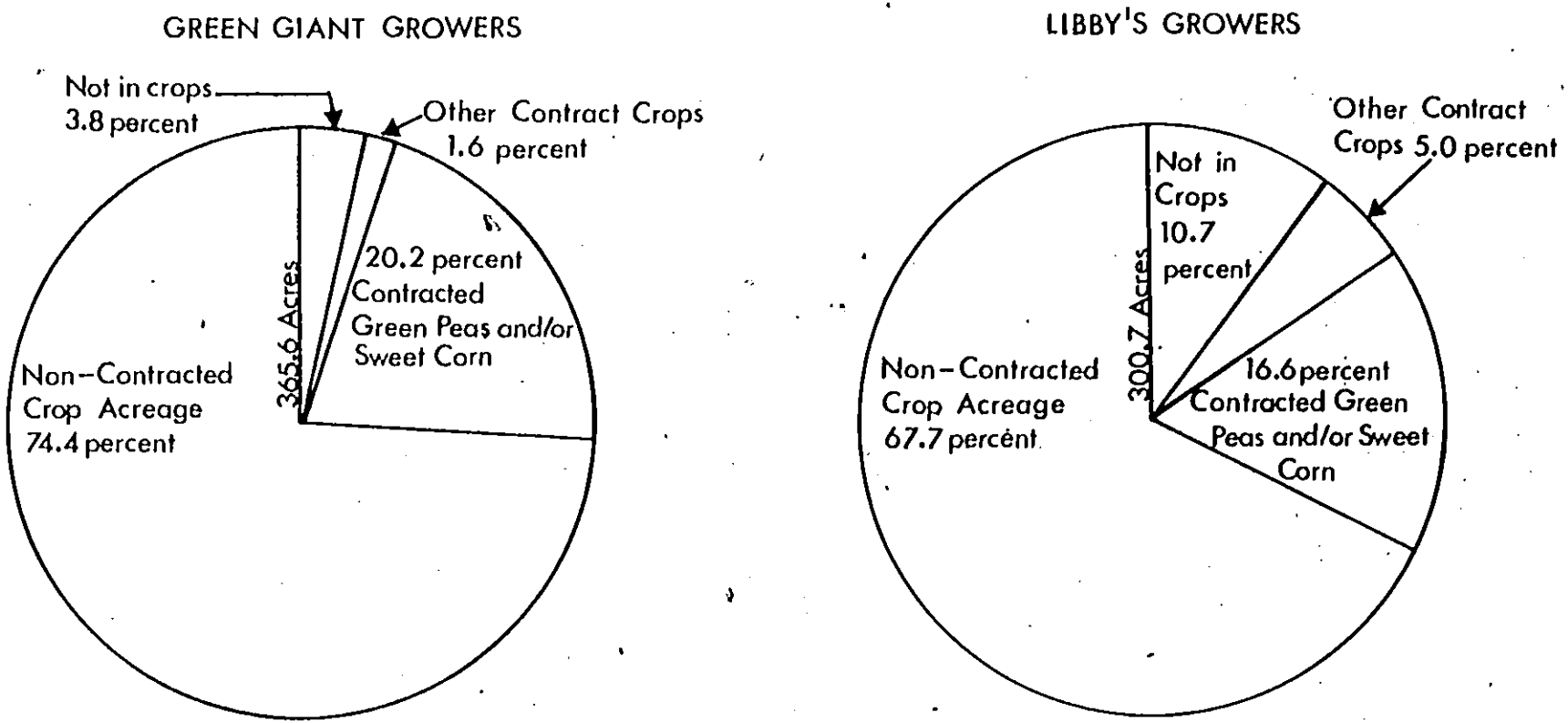
Type of Non-Contract Crop	No. of Farmers	Percentage of of Those Responding	Mean Acreage (Acres)
Corn	48	87.3	121.5
Soybeans	36	65.5	85.6
Wheat	36	65.5	42.4
Beans	19	34.5	85.3
Barley	5	9.1	54.0
Hay	5	9.1	34.0
Tobacco	1	1.8	50.0
Tomatoes	1	1.8	40.0
Asparagus	1	1.8	22.0
Oats	1	1.8	15.0

Source: Questionnaire

the growers surveyed devoted 30 percent or less of their total farmland to the cultivation of the contracted green peas and/or sweet corn (Table 28), one Green Giant grower reported as much as 81 to 90 percent, and one Libby's grower identified 61 to 70 percent of his farmland in those crops. Similar variations were observed among the growers for all the crops they grew on contract (Table 29), where some 80 percent of the growers were concentrated in the range of 30 percent or less of their total farmland. Conversely, over 70 percent of the growers for Green Giant and over 60 percent of the growers for Libby's reported non-contracted crops occupying more than 70 percent of their farmland (Table 30). Only two growers for Green Giant indicated 10 or less percent of their farmland is non-contracted crops.

Despite the observed variation in land use among both the growers for Green Giant and Libby's, an average or "typical" land use structure can be established for both groups (Figure 3). The Green Giant growers possessed very little land that was not devoted to crops (3.8 percent). Three quarters (74.4 percent) of their farmland was in non-contracted crops, one-fifth (20.2 percent) in the contracted green peas and sweet corn, and a mere 1.6 percent in other contracted crops. Libby's growers by contrast, had more land that was not cropped (10.7 percent). Two-thirds (67.7 percent) of their farmland was in non-contracted crops, 16.6 percent in the contracted green peas and sweet corn, and 5.0 percent in other contracted crops. From the standpoint of "typical" land use structure, the farms reflected the somewhat different environment and general farming practices found in the

LAND USE STRUCTURE OF FARMS



Sources: Survey of: a) 1981 Green Giant Green Peas & Sweet Corn Growers
b) 1981 Libby's Green Peas & Sweet Corn Growers

FIGURE 3

TABLE 28

Contracted Green Peas and/or Sweet Corn As Percentage Of Total Farm Acreage

Percentage of Total Farm Acreage	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-10%	17	29.8	28	42.4
11-20%	15	26.3	22	33.3
21-30%	18	31.5	8	12.1
31-40%	5	8.8	4	6.1
41-50%	0	0.0	3	4.5
51-60%	1	1.8	0	0.0
61-70%	0	0.0	1	1.5
71-80%	0	0.0	0	0.0
81-90%	1	1.8	0	0.0
91-100%	0	0.0	0	0.0
Total	57	100.0	66	100.0
	Mean Percentage=20.2		Mean Percentage=16.6	

Source: Questionnaire

TABLE 29

All Contracted Crops Acreage As Percentage Of Total Farm Acreage

Percentage of Total Farm Acreage	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-10%	17	29.8	14	21.2
11-20%	13	22.8	24	36.4
21-30%	15	26.3	15	22.7
31-40%	6	10.5	7	10.6
41-50%	4	7.0	4	6.1
51-60%	1	1.8	1	1.5
61-70%	0	0.0	1	1.5
71-80%	0	0.0	0	0.0
81-90%	1	1.8	0	0.0
91-100%	0	0.0	0	0.0
Total	57	100.0	66	100.0
	Mean Percentage=21.8		Mean Percentage=21.6	

Source: Questionnaire

TABLE 30

All Non-Contracted Crops Acreage As Percentage Of Total Farm Acreage

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	51	89.5	56	84.8
No. Response	6	10.5	10	15.2
Total	57	100.0	66	100.0

Percentage of Total Farm Acreage	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-10%	2	3.9	0	0.0
11-20%	0	0.0	0	0.0
21-30%	0	0.0	3	5.4
31-40%	2	3.9	3	5.4
41-50%	0	0.0	2	3.6
51-60%	6	11.8	8	14.3
61-70%	5	9.8	6	10.7
71-80%	13	25.5	15	26.8
81-90%	12	23.5	15	26.8
91-100%	11	21.6	4	7.1
Total	51	100.0	56	100.0
	Mean Percentage=74.4		Mean Percentage=67.7	

Source: Questionnaire

two areas, including the extent of contracts for other crops or with other processors.

A number of farmers contracted with Green Giant and Libby's also had contracts with other companies in 1981. Of the 57 farmers contracted with Green Giant, only 8 (14.0 percent) were also contracted with H.J. Heinz (tomatoes, cucumbers), Thomas Canning (tomatoes), Canadian Canners (tomatoes), and Sun-Brite Canning (tomatoes); (Appendix 2B - Questionnaire, #4). However, twenty-one (31.8 percent) of the 66 growers contracted with Libby's were also contracted with Green Giant (green peas, sweet corn), Canadian Canners (tomatoes, green peas), H.J. Heinz (tomatoes, carrots), Campbell's (green peas), Bick's (cucumbers), Lakeside Packing (peppers), Olmstead Foods (carrots), W. G. Thompson (kidney beans), and York Farms (lima beans). In both cases, however, the growers devoted considerably more land to non-contract than to contract crops. Apparently their preference was to commit more land resources to the potential of higher profits and higher risks rather than to the higher security of contract crops.

The low percentage of land not devoted to crops (mainly woodlots and pastures) suggested a small commitment, on the part of the Green Giant green peas and/or sweet corn contract farmers to livestock operations, of whom 7 raised beef cattle, 4 raised hogs, and 2 had major poultry operations. As expected, a somewhat larger proportion of Libby's growers (31.8 percent) had livestock operations. Most of the farmers (17) raised cattle (15 beef, 2 dairy), 6 raised hogs, and 1 farmer had a poultry-egg business (Appendix 2B - Questionnaire, #12).

Farm sizes varied considerably among both Green Giant and Libby's contract growers (Table 31). Many of the Green Giant growers operated farms in two size ranges: 70 to 129 acres (12 growers or 21.0 percent) and 240 to 399 acres (13 growers or 22.8 percent). Significant numbers of growers also had farms in the various ranges of 130 to 179 acres, 180 to 239 acres, 400 to 559 acres, and 560 to 759 acres and 3 growers had farms that exceeded 1,600 acres. The mean size of Green Giant growers' farms was 365.6 acres. The majority of Libby's growers had farms in 3 ranges of size: 180 to 239 acres (14 growers or 21.2 percent), 240 to 399 acres (17 growers or 25.8 percent), and 400 to 559 acres (13 growers or 19.7 percent). There were no exceptionally large farms on contract with Libby's. For Libby's growers, the mean size of their farms was 300.7 acres.

Land Improvement

In Southwestern Ontario, where the main natural impediment to crop production is poor drainage, tile drainage systems are widely used. Nearly all of Green Giant (94.5 percent) and Libby's (98.5 percent) growers grow green and/or sweet corn on tile drained land (Appendix 2B - Questionnaire #17). Only 3 growers contracted with Green Giant and 1 with Libby's did not use tile drainage for their cropland.

The vast majority of Green Giant growers (55 or 96.5 percent) and Libby's growers (60 or 90.9 percent) practiced crop rotation with their contracted crops (Appendix 2B - Questionnaire, #16). Fifty-one of 55 Green Giant growers (92.7

TABLE 31

Size of Farm (In Acres)

Farm Size (Acres)	Green Giant		Libby's	
	No. of Growers	Percentage of Total	No. of Growers	Percentage of Total
0-9	0	0.0	0	0.0
10-69	3	5.3	1	1.5
70-129	12	21.0	11	16.7
130-179	7	12.3	5	7.6
180-239	6	10.5	14	21.2
240-399	13	22.8	17	25.8
400-559	6	10.5	13	19.7
560-759	6	10.5	3	4.5
760-1119	0	0.0	2	3.0
1120-1599	1	1.8	0	0.0
1600+	3	5.3	0	0.0
	57	100.0	66	100.0
	Mean Size = 365.6 Acres		Mean Size = 300.7 Acres	

Source: Questionnaire

percent) and 52 of 60 Libby's growers (86.7 percent) stated their own specific reasons for practicing crop rotation. The chief reasons given in order of frequency of response by Green Giant growers were: to control disease (19 growers, 37.3 percent), to sustain higher yields (9 growers, 17.6 percent), to control disease and maintain soil fertility (7 growers, 13.7 percent), to control disease and weeds (4 growers, 7.8 percent), to maintain soil fertility (3 growers, 5.9 percent), to maintain soil fertility and sustain higher yields (3 growers, 5.9 percent), to control disease and sustain higher yields (3 growers 5.9 percent) and to control disease and maintain soil fertility (3 growers, 5.5 percent). Among Libby's growers the responses, in order of frequency, were almost the same: to control disease (14 growers, 26.9 percent), to sustain higher yields (14 growers, 26.9 percent), to control disease and maintain soil fertility (9 growers, 17.3 percent), to maintain soil fertility (6 growers, 11.5 percent), to control weeds (3 growers, 5.8 percent), to control weeds and maintain soil fertility (3 growers, 5.8 percent), to maintain soil fertility and sustain high yields (2 growers, 3.8 percent) and to control disease and sustain high yields (1 grower, 1.9 percent). Clearly, the farmers surveyed perceived crop rotation as a means of controlling disease which would provide for higher yields. Maintenance of soil fertility was not viewed as the main purpose of crop rotation.

Harvest and Sale of Contracted Crops

The security of contract farming becomes clear when

harvests and sales are considered. Virtually all the harvested green peas and sweet corn of both the growers contracted with Green Giant and Libby's were sold.

The pattern of variation in the volume of harvests and sales was similar to that of the acreage in both contracted crops. In the case of green peas for Green Giant, over half the growers reported both harvests and sales under 50 tons, and only one reached the 250 to 299 ton level. Both the mean harvest and mean sale were 60.6 tons (Table 32). Harvests and sales of sweet corn to Green Giant were more than twice as high (means of 140.9 and 140.5 tons, respectively), and 80 percent of the growers had harvests and sales of sweet corn ranging from 50 to 199 tons (Table 33).

Green peas growers for Libby's averaged somewhat smaller harvests and sales (54.4 and 53.7 tons, respectively) than their counterparts for Green Giant, but the proportion of farmers reporting harvests and sales below 50 tons was almost the same, and the two largest growers reported harvests and sales in the 150 to 199 ton range (Table 34). Sweet corn growers for Libby's averaged much higher mean harvests and sales (270.3 and 296.6 tons respectively), while the individual harvests and sales ranged widely (Table 35). Only two farmers reported sweet corn harvests and sales of less than 100 tons.

Crop insurance allows a grower to claim some money for the losses resulting from crop damage or poor quality and the consequent rejection of the contracted crop by the processor. In the case of growers contracted with Green Giant and Libby's

TABLE 32

1981 Green Giant - Green Peas: Harvest and Sale

	Harvest			Sale	
	No. of Farmers	Percentage of Total		No. of Farmers	Percentage of Total
Response	36	87.8	Response	36	87.8
No. Response	5	12.2	No. Response	5	12.2
Total No. Contracted	41	100.0		41	100.0

(Harvest in Tons)	No. of Farmers	Percentage of Total	(Sale in Tons)	No. of Farmers	Percentage of Total
0-49	19	52.8	0-49	19	52.8
50-99	12	33.3	50-99	12	33.3
100-149	4	11.1	100-149	4	11.1
150-199	0	0.0	150-199	0	0.0
200-249	0	0.0	200-249	0	0.0
250-299	1	2.8	250-299	1	2.8
300-399	0	0.0	300-399	0	0.0
400+	0	0.0	400+	0	0.0
Total	36	100.0		36	100.0

Mean Harvest in Tons = 60.0

Mean Sale in Tons = 60.6

Source: Questionnaire.

TABLE 33

1981 Green Giant - Sweet Corn; Harvest and Sale

	Harvest			Sale	
	No. of Farmers	Percentage of Total		No. of Farmers	Percentage of Total
Response	30	85.7	Response	30	85.7
No Response	5	14.3	No Response	5	14.3
Total No.Contracted	35	100.0	Total No.Contracted	35	100.0

(Harvest in Tons)	No. of Farmers	Percentage of Total	(Sale in Tons)	No. of Farmers	Percentage of Total
0-49	1	3.3	0-49	1	3.3
50-99	7	23.3	50-99	7	23.3
100-149	8	26.7	100-149	8	26.7
150-199	9	30.0	150-199	9	30.0
200-249	3	10.0	200-249	3	10.0
250-299	2	6.7	250-299	2	6.7
300-399	0	0.0	300-399	0	0.0
400+	0	0.0	400+	0	0.0
Total	30	100.0		30	100.0

Mean Harvest in Tons = 140.9

Mean Sale in Tons = 140.5

Source: Questionnaire

TABLE 34

1981 Libby's - Green Peas; Harvest and Sale

	Harvest			Sale	
	No. of Farmers	Percentage of Total		No. of Farmers	Percentage of Total
Response	21	100.0	Response	21	100.0
No Response	0	0.0	No Response	0	0.0
Total No.Contracted	21	100.0	Total No.Contracted	21	100.0

(Harvest in Tons)	No. of Farmers	Percentage of Total	(Sale in Tons)	No. of Farmers	Percentage of Total
0-49	11	52.4	0-49	11	52.4
50-99	8	38.1	50-99	8	38.1
100-149	0	0.0	100-149	0	0.0
150-199	2	9.5	150-199	2	9.5
200-249	0	0.0	200-249	0	0.0
250-299	0	0.0	250-299	0	0.0
300-399	0	0.0	300-399	0	0.0
400+	0	0.0	400+	0	0.0
Total	21	100.0		21	100.0

Mean Harvest in Tons = 54.4

Mean Sale in Tons = 53.7

Source: Questionnaire

TABLE 35

1981 Libby's - Sweet Corn; Harvest and Sale

	Harvest			Sale	
	No. of Farmers	Percentage of Total		No. of Farmers	Percentage of Total
Response	45	90.0	Response	45	90.0
No Response	5	10.0	No Response	5	10.0
Total No.Contracted	50	100.0	Total No.Contracted	50	100.0

(Harvest in Tons)	No. of Farmers	Percentage of Total	(Sale in Tons)	No. of Farmers	Percentage of Total
0-49	1	2.2	0-49	1	2.2
50-99	1	2.2	50-99	1	2.2
100-149	6	13.3	100-149	6	13.3
150-199	6	13.3	150-199	7	15.6
200-249	10	22.2	200-249	9	20.0
250-299	6	13.3	250-299	6	13.3
300-399	9	20.0	300-399	9	20.0
400+	6	13.3	400+	6	13.3
Total	45	100.0		45	100.0

Mean Harvest in Tons
=270.3 Tons

Mean Sale in Tons
=269.6 Tons

Source: Questionnaire

the use of crop insurance was almost universal. Only one responding grower for Green Giant (1.8 percent) and three for Libby's (4.5 percent) had no crop insurance (Appendix 2B - Questionnaire, #14).

In contract vegetable production there is always the probability the contracted grower may have to deal with the disposal of a substandard quality crop (Appendix 2B - Questionnaire, #5). Of the 46 Green Giant growers who responded, over one-half (24 or 52.2 percent) indicated they would plow the crop under and collect crop insurance. Eight growers (17.4 percent) would use the substandard crop on their farms as livestock feed, 6 growers (13.0 percent) would utilize the substandard crop as fertilizer, 5 growers (10.9 percent) claimed they would sell the sub-standard crop elsewhere as livestock feed, 2 growers (4.3 percent) would leave the crop in the field and 1 grower (2.2 percent) would sell it elsewhere at a lower price.

Among Libby's growers who responded, the majority (30 of 50 growers, or 60.0 percent) would also plow the crop underground and collect crop insurance. A higher fraction (15 growers or 30.0 percent) at Libby's would use the substandard crop as livestock feed. The remaining 5 respondents (10.0 percent) claimed they would sell the crop elsewhere as livestock feed. Most growers chose to plow the rejected crop under in order to qualify for collecting crop insurance.

Surplus crop resulting from a bumper harvest may be difficult to sell. Of the 39 Green Giant growers who responded to this question (Appendix 2B - Questionnaire, #6), 16

growers or 41.0 percent indicated that the processor would take the surplus crop because the contract for green peas and/or sweet corn did not specify a yield. Ten growers (25.6 percent) specified they would plow the surplus crop underground, 7 growers (17.9 percent) would use the surplus crop as livestock feed and 2 growers (7.7 percent) would sell the surplus crop for livestock feed. Three growers (7.7 percent) specified they would leave the surplus crop in the field and one grower (2.6 percent) claimed he would use it as fertilizer.

Of the 57 Libby's growers who responded to this question, 21 or 36.8 percent would plow the surplus crop underground. Only 19 growers (33.3 percent) indicated that the processor would take the surplus crop because there was no specific yield. Six growers (10.5 percent) would use the surplus crop as livestock feed, 6 growers (10.5 percent) would sell it elsewhere, 4 growers (7.0 percent) would sell the surplus crop for livestock feed and 1 grower (1.8 percent) would leave the surplus crop in the field (Appendix 2B - Questionnaire, #6).

Distance and Time

In any type of farm production vegetable processing system, distance is important in relation to product cost and quality. Thirty-nine of 55 Green Giant growers (70.9 percent) were 0 to 20 miles delivery distance from the processing plant (Table 36). Sixteen growers (29.1 percent) were over 20 miles in delivery distance. The mean delivery distance for Green Giant growers was 16.9 miles.

Thirty-nine of the 64 Libby's growers (61.0 percent) were 0 to 20 miles delivery distance from the processing plant (Table 36). Twenty-five growers (39.0 percent) were beyond 20 miles delivery distance and of that aggregate, 19 growers (29.7 percent) were beyond 40 miles delivery distance. The mean delivery distance for all of Libby's growers was 34.9 miles, twice as high as that for the growers of Green Giant.

Delivery distance varied considerably with the type of contracted crop. Green peas growers, whether contracted with Green Giant or with Libby's, were not far from their respective processors (Table 37). Among the green peas growers for Green Giant, 27.5 percent were within the 10 mile delivery distance, 42.5 percent ranged between 11 and 20 miles, and 30.0 percent were beyond 20 miles. For the Green Giant green peas growers, the mean delivery distance was 16.7 miles.

Regarding Libby's green peas growers, only 19 percent were within 10 miles, but 76.2 percent were between 11 and 20 miles, and only 1 Libby's respondent was beyond 20 miles delivery distance. For Libby's green peas growers the mean delivery distance was 15.0 miles.

For sweet corn growers the delivery distances to the two processors were quite different (Table 38). Among the sweet corn growers for Green Giant, 11.8 percent were within 10 miles, 61.8 percent between 11 and 20 miles, 17.6 percent were between 21 and 30 miles, and the remaining 8.8 percent between 31 and 40 miles delivery distance. For the sweet corn growers of Green Giant, the mean delivery distance was 17.4 miles.

TABLE 36

Delivery Distance Between Processor and Contract Farmers

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	55	96.5	64	97.0
No Response	2	3.5	2	3.0
Total	57	100.0	66	100.0

Distance (miles)	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-10	13	23.6	11	17.2
11-20	26	47.3	28	43.8
21-30	12	21.8	4	6.2
31-40	3	5.5	2	3.1
41 +	1	1.8	19	29.7
Total	55	100.0	64	100.0

Mean Distance= 16.9 Miles

Mean Distance= 34.9 Miles

Source: Questionnaire

TABLE 37

Delivery Distance for Green Peas

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	40	97.6	21	100.0
No Response	1	2.4	0	0.0
Total	41	100.0	21	100.0
Distance (Miles)	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-10	11	27.5	4	19.0
11-20	17	42.5	16	76.2
21-30	8	20.0	1	4.8
31-40	3	7.5	0	0.0
41 +	1	2.5	0	0.0
Total	40	100.0	21	100.0
	Mean Distance=16.7 Miles		Mean Distance=15.0 Miles	

Source: Questionnaire

By contrast, many of Libby's sweet corn growers (38.8 percent) were located beyond the 41 miles delivery distance from the processing plant (Table 38). Therefore the mean delivery distance for Libby's sweet corn growers was 41.5 miles, more than twice that of Green Giant sweet corn growers.

Time is another dimension of delivery distance. Of the Green Giant growers 32 of 46 or 69.6 percent were within 30 minutes delivery time and the rest beyond 30 minutes of delivery time (Table 39). The mean delivery time for Green Giant growers was 35.1 minutes.

Among Libby's growers, however, only 25 of 49 or 51.0 percent were within 30 minutes delivery time (Table 39). The mean delivery time for Libby's growers was 56.4 minutes, some 60 percent higher than that for Green Giant.

As in the case of distance, the delivery time for the two growers differed dramatically with the type of crop. Both the Green Giant and Libby's green peas growers enjoyed relatively short delivery times (34.3 and 31.2 minutes, respectively). Twenty-seven of 36 or 75 percent of the Green Giant green peas growers were located within 30 minutes delivery time, whereas 76.5 percent of the Libby's growers were in that category (Table 40). Most green peas growers for both processors were located in the 16 to 30 minutes delivery range.

Delivery time for sweet corn growers varied considerably between the two processors: a mean of 34.0 minutes for Green Giant growers and 65.1 minutes for Libby's (Table 41). Again, most of the sweet corn growers for Green Giant were

TABLE 38

Delivery Distance for Sweet Corn

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	34	97.1	49	98.0
No Response	1	2.9	1	2.0
Total	35	100.0	50	100.0
Distance (Miles)	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-10	4	11.8	6	12.2
11-20	21	61.8	18	36.7
21-30	6	17.6	4	8.2
31-40	3	8.8	2	4.1
41 +	0	0.0	19	38.8
Total	34	100.0	49	100.0
	Mean Distance= 17.4 Miles		Mean Distance= 41.5 Miles	

Source: Questionnaire

TABLE 39

Delivery Time Between Processor and Contract Farmers

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	46	80.7	49	74.2
No Response	11	19.3	17	25.8
Total	57	100.0	66	100.0

Delivery Time (Minutes)	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-15	8	17.4	3	6.1
16-30	24	52.2	22	44.9
31-45	6	13.0	4	8.2
46-60	6	13.0	8	16.3
61 +	2	4.3	12	24.5
Total	46	100.0	49	100.0

Mean Time=35.1 Minutes

Mean Time=56.4 Minutes

Source: Questionnaire

TABLE 40

Delivery Time for Green Peas

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	36	87.9	17	81.0
No Response	5	12.2	4	19.0
Total	41	100.0	21	100.0

Delivery Time (Minutes)	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-15	8	22.2	0	0.0
16-30	19	52.8	13	76.5
31-45	3	8.3	3	17.6
46-60	4	11.1	1	5.9
61 +	2	5.6	0	0.0
Total	36	100.0	17	100.0

Mean Delivery Time =34.3 Minutes

Mean Delivery Time =31.2 Minutes

Source: Questionnaire

TABLE 41

Delivery Time for Sweet Corn

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	26	77.1	36	72.0
No Response	9	22.9	14	28.0
Total	35	100.0	50	100.0

Delivery Time (Minutes)	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-15	0	0.0	3	8.3
16-30	18	69.2	13	36.1
31-45	4	15.4	1	2.8
46-60	4	15.4	7	19.4
61 +	0	0.0	12	33.3
Total	26	100.0	36	100.0

Mean Delivery Time =34.0 Minutes

Mean Delivery Time =65.1 Minutes

Source: Questionnaire

located beyond 60 minutes delivery time, a range in which there were no sweet corn growers for Green Giant.

The timing of delivery merits consideration. Because the peak of the harvesting processing period for vegetables occurs in the July to October period, the processor would prefer to stagger the harvesting delivery times for specific crops. The decision for the harvesting delivery of the contracted crop is made by the fieldman of the vegetable processing company.

To insure the harvested vegetable crop is processed at the peak of quality it must be delivered to the processor efficiently and quickly. Of the 55 growers (96.5 percent) who responded to the question dealing with transportation of the harvested crop/crops to the processor, 44 or 80.0 percent were not responsible for this task (Appendix 2B - Questionnaire, #13). The remaining 11 growers, however, transported the contracted vegetable crops to the company themselves.

Among Libby's growers, 64 or 96.7 percent responded to the transportation question and 54 or 84.4 percent were not responsible for transporting the contracted vegetable harvest to the company, but the remaining 10 growers were. In both cases, the processors have assumed responsibility, in most instances, to transport the contracted vegetable harvest to their plants, either themselves or by hired truckers.

Socioeconomic Parameters

All growers for Green Giant and Libby's were land owners. Most of the growers, whether for Green Giant (94.5

percent) or for Libby's (98.5 percent) owned land in the range from 10 to 559 acres (Table 42). Only two growers, in contract with Green Giant, owned between 1,120 and 1,599 acres of land. As a consequence, the mean size of land ownership for the Green Giant growers was 223.6 acres, whereas for the Libby's growers it was 217.1 acres.

In addition to owning land, most of the growers rented land to some extent. The majority of growers contracted with Green Giant (32 or 86.4 percent) and Libby's (41 or 95.3 percent) rented land from 10 to 399 acres (Table 43). Only four growers for Green Giant rented land between 400 and 1,559 acres of land. Consequently, the mean rental of land by the Green Giant growers was 236.9 acres, whereas for the Libby's growers it was 195.6 acres. Therefore, the Green Giant growers rented a little more land than they owned, whereas the Libby's growers owned more land than they rented.

Responses concerning rented land as percentage of the entire farm confirmed this observation. Although percentages in both groups ranged from the tens to the eighties and in the case of Green Giant even included three growers in the nineties, 59.5 percent of the Green Giant growers rented more than 50 percent of their farm land, whereas only 18.6 percent of the Libby's growers rented more than 50 percent of their farmland (Table 44). The means for Green Giant and Libby's growers, respectively, were 53.3 and 35.6 percent.

The age of contract farmers ranged widely (Table 45). In the case of Green Giant growers, their ages ranged from 21

TABLE 42

Land Ownership

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	54	94.7	66	100.0
No Response	3	5.3	0	0.0
Total	57	100.0	66	100.0

Land Owned (Acres)	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-9	0	0.0	0	0.0
10-69	9	16.7	4	6.1
70-129	16	29.6	15	22.7
130-179	8	14.8	13	19.7
180-239	9	16.7	14	21.2
240-399	4	7.4	13	19.7
400-559	5	9.3	6	9.1
560-759	1	1.8	1	1.5
760-1119	0	0.0	0	0.0
1120-1599	2	3.7	0	0.0
1600+	0	0.0	0	0.0
Total	54	100.0	66	100.0
	Mean Size=223.6 Acres		Mean Size=217.1 Acres	

Source: Questionnaire

TABLE 43

Land Rental

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	37	64.9	43	65.2
No Response	20	35.1	23	34.8
Total	57	100.0	66	100.0

Land Rented (Acres	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
0-9	1	2.7	1	2.3
10-69	6	16.2	15	34.9
70-129	7	18.9	10	23.3
130-179	5	13.5	6	13.9
180-239	5	13.5	4	9.3
240-399	9	24.3	6	13.9
400-559	2	5.4	1	2.3
560-759	0	0.0	0	0.0
760-119	1	2.7	0	0.0
1120-1599	1	2.7	0	0.0
1600+	0	0.0	0	0.0
Total	37	100.0	43	100.0
	Mean Size=236.9 Acres		Mean Size=195.6 Acres	

Source: Questionnaire

TABLE 44 B

Rented Land As Percentage of Total Farm Size

Rented Land As Percentage of Total Farm Size	Green Giant		Libby's	
	No. of Farmers	Percentage	No. of Farmers	Percentage
0-10%	4	10.8	7	16.3
11-20%	4	10.8	5	11.6
21-30%	4	10.8	7	16.2
31-40%	2	5.4	5	11.6
41-50%	1	2.7	11	25.6
51-60%	5	13.5	1	2.3
61-70%	4	10.8	4	9.3
71-80%	6	16.2	2	4.7
81-90%	4	10.8	1	2.3
91-100%	3	8.1	0	0.0
Total	37	100.0	43	100.0
	Mean Percentage= 53.3		Mean Percentage= 35.6	

TABLE 45

Age of Contract Farmers

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	54	94.7	65	98.5
No Response	3	5.3	1	1.5
Total	57	100.0	66	100.0

Age	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Under 21 yrs.	0	0.0	2	3.1
21 to 30 yrs.	4	7.4	12	18.5
31 to 40 yrs.	17	31.5	13	20.0
41 to 50 yrs.	12	22.2	19	29.2
51 to 60 yrs.	17	31.5	14	21.5
61 to 70 yrs.	4	7.4	4	6.2
Over 70 yrs.	0	0.0	1	1.5
Total	54	100.0	65	100.0
	Mean=45.5 years		Mean=42.9 years	

Source: Questionnaire

to 70 years, although two groupings appeared in the 31 to 40 years range (31.5 percent) and in the 51 to 60 years range (31.5 percent). A substantial number (12 growers or 22.2 percent) filled the intervening range from 41 to 50 years. The mean age was 45.5 years.

In the case of Libby's growers the range was even wider for it included two growers under 21 years of age and one over 70. However, the main grouping of the Libby's growers (19 or 29.2 percent) was in the 41 to 50 years range, and the mean age of Libby's growers was 42.9 years. Between the two groups, therefore, the age of contract farmers did not differ significantly.

Most growers, whether for Green Giant (90.9 percent) or Libby's (89.4 percent), had farming experience before their involvement in contract farming (Table 46). The length of their farming experience ranged considerably among both groups. In both groups a small percentage (12.0 percent for Green Giant, 12.7 percent for Libby's growers) had experience of less than one year, and the largest number (34.0 and 30.9 percent, respectively) had from one to five years experience. However, a larger number of growers for Green Giant (20.0 percent as compared to 9.1 percent for Libby's growers) had experience of more than 30 years, resulting in their somewhat higher mean in previous experience (13.4 years, as compared to 10.9 years). There was no significant difference in the number of years of farming experience before involvement in contract farming between the two groups.

TABLE 46

Farming Experience Before Contracting

Farmer Before Contracting	Green Giant			Libby's		
	No. of Farmers	Percentage of Total	Percentage of Response	No. of Farmers	Percentage of Total	Percentage of Response
Yes	50	87.7	90.9	59	89.4	89.4
No	5	8.8	9.1	7	10.6	10.6
No Response	2	3.5	----	0	0.0	----
Total	57	100.0	100.0	66	100.0	100.0

Time in Farming Before Contracting	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	50	100.0	55	93.2
No Response	0	0.0	4	6.8
Total	50	100.0	59	100.0

Farming Experience	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Less than 1 Year	6	12.0	7	12.7
1 to 5 years	17	34.0	17	30.9
6 to 10 years	5	10.0	10	18.2
11 to 15 years	3	6.0	4	7.3
16 to 20 years	3	6.0	8	14.5
21 to 25 years	3	6.0	2	3.6
26 to 30 years	3	6.0	2	3.6
Over 30 years	10	20.0	5	9.1
Total	50	100.0	55	100.0
	Mean = 13.4 Years		Mean = 10.9 Years	

Source: Questionnaire

The length of contract farming experience the contract farmers had varied widely in both groups; from less than one year to more than 30 years (Table 47). Among the Green Giant growers, the largest number (13 or 23.2 percent) was in the 6 to 10 year range, but significant aggregates were also in the 1 to 5 years range (8 or 14.3 percent), 11 to 15 years range (9 or 16.1 percent) and also over 30 years contracting experience (8 or 14.3 percent). For Green Giant growers, the mean time in contract farming was 14.5 years.

Among the Libby's respondents, the largest number 13 or 20.0 percent was in the 1 to 5 year range, but almost as many 12 or 18.5 percent also had less than 1 year contracting experience (Table 47). The average number of years in contracting for Libby's growers, therefore, was 12.7 years. In both groups the growers had about one year more experience in contract farming than in farming before contracting.

In summary, the growers for Green Giant and Libby's, on the average, were middle aged (45.5 and 42.7 years, respectively), had acquired over a decade (13.4 and 10.9 years) of farming experience before contracting, and had over another decade (14.5 and 12.7 years) of experience in contracting.

The level of education that contract farmers attained varied both within the processors' groups and between them (Appendix 2B - Questionnaire, #34). The largest groups had some secondary schooling both among the Green Giant (19 or 33.9 percent) and Libby's (18 or 27.3 percent) growers. However, whereas the next largest group among the Green Giant

TABLE 47

Contracting Experience

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	56	98.2	65	98.5
No Response	1	1.8	1	1.5
Total	57	100.0	66	100.0

Time Involved in Contract Farming	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Less than 1 year	5	8.9	12	18.5
1 to 5 years	8	14.3	13	20.0
6 to 10 years	13	23.2	5	7.7
11 to 15 years	9	16.1	8	12.3
16 to 20 years	4	7.1	11	16.9
21 to 25 years	5	8.9	7	10.8
26 to 30 years	4	7.1	4	6.1
Over 30 years	8	14.3	5	7.7
Total	56	100.0	65	100.0
	Mean = 14.5 years		Mean = 12.7 years	

Source: Questionnaire

growers consisted of those with complete primary education (15 or 26.8 percent), the second largest group among the Libby's growers consisted of graduates from a college or university (17 or 25.8 percent). Of the Green Giant growers (2 or 3.6 percent) had some college and university education and (8 or 14.3 percent) were college or university graduates, whereas among the Libby's growers another (4 or 6.1 percent) had some college or university education. High school graduates were proportionately less common among the Green Giant (10 or 17.8 percent) than among Libby's (16 or 24.2 percent) growers, perhaps relating to a somewhat older population among the Green Giant growers. Specifically, nearly twice the proportion of the Libby's growers (21 or 32.3 percent) attended agricultural school or had taken courses relating to agriculture in comparison to the Green Giant growers (9 or 17.3 percent; Appendix 2B - Questionnaire # 35).

For the farmer, the immediate family usually contributes the needed labour inputs. These include his wife, children, brothers and/or sisters.

Most of the Green Giant (49 or 87.5 percent) and Libby's (55 or 83.3 percent) growers were married (Appendix 2B-Questionnaire, #24). Among the married growers, most had their wives helping them (38 or 77.6 percent for the Green Giant group, 42 or 76.4 percent for the Libby's group; Appendix 2B-Questionnaire #26). However, only a minority of the wives (14 or 36.8 percent at Green Giant, 8 or 19.0 percent at Libby's) helped on a daily basis. The majority of the helping wives contributed

on an infrequent basis (Green Giant 24 or 63.2 percent; Libby's 34 or 81.0 percent), some at peak times (Green Giant 9 or 23.7 percent; Libby's, 17 or 40.5 percent) and others occasionally (15 or 39.5 percent at Green Giant; 17 or 40.5 percent at Libby's).

Most of the Green Giant (48 or 88.9 percent) and Libby's (52 or 78.8 percent) growers had children (Appendix 2B-Questionnaire, #27). Of the growers with children, most indicated their children helped on the farm (39 or 81.3 percent at Green Giant, 47 or 90.4 percent at Libby's). As with the wives, however, only a minority of the children helped on a daily basis (Green Giant 13 or 33.3 percent, Libby's 17 or 36.2 percent). The rest helped either at peak times (Green Giant 15 or 38.5 percent, Libby's 15 or 31.9 percent), or on an occasional basis (Green Giant 11 or 28.2 percent, Libby's 15 or 31.9 percent).

Most of the Green Giant (50 or 87.7 percent) and Libby's (58 or 89.2 percent) growers had brothers and/or sisters (Appendix 2B - Questionnaire, #29). More than half of them helped their relatives in their contract farming for Green Giant (29 or 52.7 percent) and Libby's (26 or 62.1 percent). More commonly the brothers and/or sisters of Green Giant growers helped on a daily basis (13 or 44.8 percent), but this was less common (6 or 16.7 percent) among the Libby's growers. On the other hand, the growers for Green Giant did not receive as much assistance from their brothers and/or sisters at peak times (3 or 10.3 percent) or occasionally (13 or 44.8 percent), as

did those for Libby's (11 or 30.5 percent at peak times and 19 or 52.8 percent occasionally).

Outside labour was employed by more than half of the growers for Green Giant (32 or 56.1 percent) and Libby's (36 or 54.5 percent; Appendix 2B-Questionnaire #31). Very few growers, whether those on contract with Green Giant (4 or 12.5 percent) or Libby's (5 or 13.9 percent), employed outside labour on a daily basis. Most employed their outside labour at peak times (20 or 62.5 percent at Green Giant, 25 or 69.4 percent at Libby's), or occasionally (8 or 25.0 percent at Green Giant, 6 or 16.7 percent at Libby's; Appendix 2B-Questionnaire, #32).

The majority of contract growers were full-time farmers (Appendix 2B-Questionnaire #17). For 39 Green Giant growers (69.6 percent) farming was their full-time occupation while 17 (30.4 percent) had other full-time jobs or businesses. Most of the Libby's growers (54 or 81.8 percent) were full-time farmers, the remaining (12 or 18.2 percent) had other occupations or businesses.

The advantages of contract farming can be measured in terms of income from that source in comparison to other sources of income. Income was categorized as either off-farm or farm, with the latter derived from either contract or non-contract operations. More than one-third of the growers responded to the off-farm income question, the majority indicating they had such income (Tables 48 and 49). Among those with off-farm income, the largest number of Green Giant growers was in the

TABLE 48

Income

Green Giant Growers

	Farm Income					
	Off-Farm Income		Contract		Non-Contract	
	No.	Percentage of Total	No.	Percentage of Total	No.	Percentage of Total
Response	22	38.6	49	86.0	49	86.0
No Response	35	61.4	8	14.0	8	14.0
Total	57	100.0	57	100.0	57	100.0
Annual Income						
$10,000 or less	6	27.3	21	42.9	6	12.2
$10,001 to $20,000	10	45.4	16	32.7	17	34.7
$20,001 to $40,000	4	18.2	6	12.2	9	18.4
$40,001 to $60,000	1	4.5	3	6.1	6	12.2
$60,001 to $80,000	0	0.0	1	2.0	4	8.2
$80,001 to $100,000	1	4.5	1	2.0	3	6.1
$100,001 +	0	0.0	1	2.0	4	8.2
	22	100.0	49	100.0	49	100.0
	Mean Income =$20,000		Mean Income =$19,286		Mean Income =$37,653	

Source: Questionnaire

TABLE 49

Income

Libby's Growers

	Farm Income					
	Off-Farm Income		Contract		Non-Contract	
	No.	Percentage of Total	No.	Percentage of Total	No.	Percentage of Total
Response	26	39.4	60	90.0	58	87.9
No Response	40	60.6	6	9.1	8	12.1
Total	66	100.0	66	100.0	57	100.0
Annual Income						
$10,000 or less	16	61.5	19	31.7	4	6.9
$10,001 to $20,000	2	7.7	18	30.0	11	19.0
$20,001 to $40,000	5	19.2	8	13.3	17	29.3
$40,001 to $60,000	1	3.8	8	13.3	13	22.4
$60,001 to $80,000	0	0.0	2	3.3	1	1.7
$80,001 to $100,000	0	0.0	2	3.3	2	3.4
$100,001 +	2	7.7	3	5.0	10	17.2
	26	100.0	60	100.0	58	100.0
	Mean Income =$20,384		Mean Income =$27,583		Mean Income =$46,466	

Source: Questionnaire

$10,001 to $20,000 range (45.4 percent) whereas the largest number of Libby's growers was in the $10,000 or less range (61.5 percent). There was not a large difference in the mean annual off-farm incomes between Green Giant and Libby's growers (Tables 48, 49).

Farm income from the contract and non-contract sectors combined was about two to two and a half times higher than off-farm income, but when taken separately, the non-contract farming averaged the highest earnings for both Green Giant and Libby's growers (Tables 48,49). Although non-contract farming provided a higher volume of earnings for most growers, contract farming provided higher earnings per acre of land devoted to it.

Contract farming appeared to bring increased income to most of the Green Giant (66.1 percent) and Libby's (59.0 percent) growers (Table 50). Very few experienced a great increase (Green Giant 1.8 percent, Libby's 6.5 percent), most experienced a slight increase (Green Giant 64.3 percent, Libby's 52.5 percent), some experienced no change (Green Giant 30.3 percent, Libby's 24.6 percent), a few experienced a slight decrease (Green Giant 3.6 percent, Libby's 13.1 percent), and only two Libby's growers (3.3 percent) reported a great decrease in annual income.

TABLE 50

Contracting And Changes In Annual Income

	Green Giant		Libby's	
	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Response	56	98.2	61	92.4
No. Response	1	1.8	5	7.6
Total	57	100.0	66	100.0

Any Change In Annual Income	No. of Farmers	Percentage of Total	No. of Farmers	Percentage of Total
Increased Greatly	1	1.8	4	6.5
Increased Slightly	36	64.3	32	52.5
Not Changed	17	30.3	15	24.6
Decreased Slightly	2	3.6	8	13.1
Decreased Greatly	0	0.0	2	3.3
Total	56	100.0	61	100.0

Source: Questionnaire

Testing and Evaluation of Hypotheses

Hypothesis 1 Distance and contracted acreage.

In relation to Green Giant green peas growers (a), sweet corn growers (b), and Libby's green peas growers (c) and sweet corn growers (d), the Z observed values were less than the Z critical values (Appendix 3B). The test results reveal that there is no correlation between distance and contracted acreage - economies of scale. Therefore hypothesis 1 is accepted.

The size of contracted acreages were random over distance and economies of scale was not evident (Appendices 3D, 3E, 3F and 3G). To the processors, the size of the contracted acreages within their contract boundaries were of no consequence in relation to distance. Even in the case where Libby's contracted sweet corn growers outside their 20 mile boundary, there was no apparent concern to contract larger units with greater economies of scale. Libby's was willing to spare the expense for procurement of sweet corn for processing because the company did not want to lose its share of the processed sweet corn market.

Hypothesis 2 Distance and the number of tasks.

The Z observed values were less than the Z critical values in relation to Green Giant green peas growers 2a), 2b), and Libby's green peas growers 2c) and sweet corn growers 2d), (Appendix 3B). The test results imply that there is no correlation between distance and the number of tasks (labour inputs) provided by both Green Giant and Libby's for their contracted green peas and sweet corn growers. Therefore hypothesis 2 is accepted.

Within the contract boundaries of both processors, costs transpiring because of the number of tasks (labour inputs) provided for individual growers would not be altered by distance. Libby's contracted for sweet corn with farmers beyond the 20 mile contract boundary but this did not modify the number of tasks provided by the company. Where tasks are required, Libby's will provide them because it needs adequate and continuous supplies of high quality sweet corn to satisfy their processing needs.

Hypotheses 3 & 4 Contracted acreage and the number of material and equipment inputs, (3).

Contracted acreage and the number of tasks (labour inputs), (4).

It was expected that there should be negative correlations between both contracted acreage and the number of material and equipment inputs; and contracted acreage and the number of tasks (labour inputs) provided by the company. In relation to Green Giant green peas growers 3a), sweet corn growers 3b) and Libby's green peas growers 3c) and sweet corn growers 3d), the Z observed values were less than the Z critical values (Appendix 3B). The test results reveal that there is no correlation between contracted acreage and the number of material and equipment inputs. Therefore hypothesis 3 is rejected.

For Green Giant green peas growers 4a), sweet corn growers 4b) and Libby's green peas growers 4c) and sweet corn growers 4d), the Z observed values were less than the Z critical values (Appendix 3B). The test results show that there is no correlation between contracted acreage and the number of tasks (labour

inputs). Therefore hypothesis 4 is rejected.

The assumption that the company provides less inputs (material and equipment, tasks) for the growers who have larger contracted acreages and more inputs (material and equipment, tasks) for the growers who have smaller contracted acreages does not prevail. The size of the contracted acreage adopted by a contract grower does not reflect the magnitude of his farm operations and its economic and technological capacity. Therefore contracted acreage undertaken by a grower does not influence the number of inputs provided by the processor.

Hypothesis 5 Contracting experience and contracted acreage.

The Chi-Square test for statistical significance of the relationship between contracting experience and contracted acreage indicates that there is no significant relationship (Appendix 3C). Therefore hypothesis 5 is rejected.

The results of this statistical analysis reveal that Green Giant and Libby's do not use contracting experience as criterion for the establishment of contracts (size of contracted acreage) with growers.

CHAPTER VII

CONCLUSIONS

Contracting is the most efficient means for getting the high quality and assured quantity of vegetables (green peas and sweet corn) needed for processing at the right time. Marketing boards oversee the negotiations between the processors' representatives and the growers' representatives and ratify the agreements between them for prices, terms and the conditions of sale regarding green peas and sweet corn.

In contracting, the minimization of distance between the growers and the processing plant is a declared intention. Yet for both companies the mean delivery distance varied with the type of contracted crop. Green peas growers contracted with both Green Giant and Libby's were not far in distance (miles and minutes) from their respective processors. Sweet corn growers contracted by Green Giant were relatively close (miles and minutes) to the processing plant but Libby's sweet corn growers in comparison were located much farther away (miles and minutes). This situation concerning Libby's sweet corn growers was due to the crop market conditions in 1981. Farmers in Kent County opted to grow seed corn and/or grain corn instead of sweet corn because the former commanded higher prices. Consequently, Libby's had to contract for sweet corn with growers at substantial distances from the Wallaceburg processing plant.

Within the areas where growers were contracted, statistical analysis revealed that there was no correlation between the distance of the grower to the processing plant and the contracted acreage (economics of scale) of that grower. Thus, in relation to distance, the distribution of contracted acreages was random.

There was no correlation between distance and the number of tasks (labour inputs) provided by both Green Giant and Libby's for their contracted green peas and sweet corn growers. Thus, in relation to distance, the distribution of the number of tasks (labour inputs) was also random. Indeed Libby's even demonstrated willingness to contract growers and provide tasks (labour inputs) at considerable distances (far beyond the usual 20 mile limit) in order to assure adequate and continuous supplies of high quality sweet corn for its processing needs.

Statistical analysis also demonstrated that there was not correlation between the contracted acreage of a grower and the number of inputs (material and equipment, tasks) provided by the processor. The optimized sharing assumption that the processors provides fewer inputs (material and equipment, tasks) for growers with larger contracted acreages and more inputs (material and equipment, tasks) for growers with smaller contracted acreages does not hold. Instead, the standard contract prevails.

The contracting experience of growers also has no bearing upon the size of contracted acreage designated to them by the

processors. Statistical analysis indicates that there is no significant relationship between contracting experience in years and the size of contracted acreage.

Results from the statistical tests reveal that both Green Giant and Libby's control almost everything in the crop production system by contract. Both companies enjoy a monopolistic position with respect to their growers. For the two processors strict control of the production system is necessary in order to achieve the high quality and continuous supplies of sweet corn and/or green peas.

For most of the growers contracted by Green Giant and Libby's, contracting in general represents a smaller percentage of their total crop acreage. For a large number of Green Giant and Libby's growers, the predominant non-contract crops grown were soybeans, corn and wheat. The importance of non-contract crops over contract crops is evident in relation to their farm income. Most of the growers made more money in non-contracting than in contracting. However, contract vegetable growing generated more income on a per acre land basis than did field crops sold on the open market.

Contracting provides for diversification of the farm operations and an income buffer against the possibility of poor markets and low prices in the open market. For both Green Giant and Libby's a number of growers contracted for green peas and/or sweet corn in 1981 were also contracted in 1980. This continuity reflects the assured market and price security and stability of contracting. But the 1981 Libby's sweet corn situation, where

many former sweet corn growers epted to grow grain corn and/or seed corn because of higher prices, illustrates that farmers may choose profit potential over the stability of contracting.

In relation of the family farm in contracting, the whole farm operation still remains under the ownership and often lease of the contracted grower and his family. The part of the farm acreage involved in contracting however, no longer remains under complete control of the grower and his family. Although, the immediate family is a readily available source of labour for the contracting operation, many specialized tasks are performed by the processing firm on the contracted acreage itself. Thus the grower and his immediate family have the opportunity to devote most of their time towards the non-contract part of the farm operations.

The growers contracted by Green Giant and Libby's perceived both advantages and disadvantages to this monopolistic system. Fifty-two of the 57 Green Giant growers (91.2 percent) denoted that there were advantages to contracting and 5 growers (8.8 percent) did not state any specific advantages. To Green Giant growers the major advantages to contracting were: (1) The security of a guaranteed fixed price that is set prior to planting (31 growers, 54.4 percent); (2) The sharing of the work load with some tasks (labour inputs) performed by the company (8 growers, 15.4 percent); (3) The early harvests that make double cropping possible (5 growers, 9.6 percent); (4) The financial security that provides guaranteed income (4 growers,

7.7 percent); (5) The provision of certain inputs, such as harvesting and hauling, by the company (3 growers, 5.8 percent) and (6) The potential for higher income (1 grower, 1.9 percent; Appendix 2B - Questionnaire #37).

Fifty-eight of 66 Libby's growers (87.9 percent) also stated that there were certain advantages to contracting and 8 growers (12.1 percent) did not specify any advantages. According to Libby's growers the major advantages offered by contracting were: (1) The security of a guaranteed fixed price that is set prior to planting (27 growers, 46.6 percent); (2) The provision of certain inputs by the company, such as harvesting and hauling (11 growers, 19.0 percent); (3) The early harvests that make double cropping possible (8 growers, 13.8 percent); (4) The sharing of the work load, with some tasks performed by the company (6 growers, 10.3 percent); (5) The financial security that provides guaranteed income (5 growers, 8.6 percent) and (6) The potential for higher income (1 grower, 1.7 percent; Appendix 2B - Questionnaire #37).

To growers contracted with both Green Giant and Libby's, there are also disadvantages to contracting. Thirty-nine Green Giant growers (68.4 percent) claimed there were disadvantages encountered because of contracting. For Green Giant growers the major disadvantages were: (1) Damage to the field (tiles and soil) when harvesting under wet conditions (16 growers, 41.0 percent); (2) The loss of complete independence and inability to be your own boss (13 growers, 33.3 percent); (3) High harvesting costs

(5 growers, 12.8 percent); (4) Harvesting the crop at the peak of freshness but often times during bad weather conditions and not when weather conditions are good (4 growers, 10.2 percent); and (5) High hauling costs of the harvested crop to the processor (1 grower, 2.6 percent; Appendix 2B - Questionnaire #37).

Forty-five of the 66 Libby's growers (68.2 percent) stipulated that there were disadvantages to contracting and 21 growers (31.8 percent) did not state any particular disadvantages due to contracting. To the responding Libby's growers the leading disadvantages were: (1) The loss of complete independence and inability to by your own boss (17 growers, 37.8 percent); (2) Damage to the field (tiles and soil) when harvesting under wet conditions (16 growers, 35.5 percent); (3) Harvesting the crop at the peak of freshness but often times during bad weather conditions and not when weather conditions are good (8 growers, 17.8 percent); and (4) high harvesting costs (4 growers, 8.9 percent; Appendix 2B - Questionnaire #37).

The disadvantages identified by the growers relate mostly to the monopolistic position of the processing firm. The loss of complete independence and inability to be your own boss was a major disadvantage mentioned by a large number of both Green Giant and Libby's contract growers. The companies, through their fieldman, decide when it is time to harvest. Because the companies want to obtain contracted vegetables at the peak of quality regardless of what the weather and soil conditions are

like, harvesting may happen even during rainy weather. Hence the loss of decision-making is the main perceived disadvantage for the grower.

But even though there are disadvantages, advantage such as price security and stability must be considered. Contract growers know the price they will be getting for the crop even before it has been planted. Through marketing agreements in the spring, prices to be paid for green peas and sweet corn have been established and they cannot change. For the grower, the guaranteed contract price is a safeguard against price fluctuations which often occur in the open-market. The guaranteed price deprives the grower of his change to make a greater profit on the open-market, but it also spares him from disaster.

APPENDIX 1

LOCATION OF CONTRACTED GROWERS

Green Giant[a]			Libby's[b]		
Location	No. of Growers Contracted	Percentage of Contracted Total	Location	No. of Growers Contracted	Percentage of Contracted Total
Essex County			Kent County		
Windsor	8	7.5	Wallaceburg	11	9.9
Oldcastle	3	2.8	Tupperville	2	1.8
Maidstone	13	12.1	Dresden	9	8.1
Woodslee	12	11.2	Thamesville	6	5.4
Tecumseh	4	3.7	Kent Bridge	2	1.8
Emeryville	1	0.9	Dover Centre	4	3.6
Belle River	10	9.3	Grant Point	2	1.8
St. Joachim	3	2.8	Paincourt	9	8.1
Stoney Point	1	0.9	Chatham	29	26.1
Tilbury	2	1.9	Elgin County		
Ruthven	1	0.9	Rodney	5	4.5
Essex	12	11.2	West Lorne	2	1.8
Harrow	5	4.7	Dutton	4	3.6
McGregor	4	3.7	St. Thomas	5	4.5
Amherstburg	28	26.2	Middlesex County		
			Glanworth	3	2.7
Total	107	100.0	Belmont	3	2.7
			Lucan	1	0.9
			Granton	1	0.9
			Perth County		
			St. Mary's	3	2.7
			Kirkton	4	3.6
			Huron County		
			Centralia	2	1.8
			Exeter	3	2.7
			Hensall	1	0.9
			Total	111	100.0

Sources: a) Green Giant 1981 Green Peas and Sweet Corn Growers Lists.
b) Libby's 1981 Green Peas and Sweet Corn Growers Lists.

University of Windsor

APPENDIX 2A

Stage 1- Introductory letter

November 12, 1981

Dear Sir/Madam:

I am a graduate student studying geography at the University of Windsor. At the present time I am collecting data for my Master of Arts thesis which deals with contract vegetable farming in Essex and Kent Counties, Ontario. As a contract vegetable farmer, you have contributed to making the two counties among the most productive in all of Canada.

For a thorough analysis of contract vegetable production within this agricultural region, a survey of contract vegetable farmers is necessary. I would like to request your assistance in this project - to fill out a questionnaire that will be mailed to you within approximately ten days. Your cooperation in filling out this questionnaire is most important for the completion of my graduate research.

The questionnaire has been prepared under the supervision of the Department of Geography at the University of Windsor. No other group, organization or government agency is involved in this study.

All information from the questionnaire will be held in strict confidence. No names, addresses, or telephone numbers will be needed for the questionnaire. Once the survey has been completed, all information will be transformed into statistical data guaranteeing complete individual privacy.

For your cooperation and time in answering the questionnaire, I will be most grateful. If you have any questions, please contact me or my thesis advisor, Dr. I. Stebelsky, at the Department of Geography, University of Windsor, (Ph. 253-4232, Ext. 669).

Yours sincerely,

Dennis Tyszko

Dennis Tyszko
M.A. Thesis Researcher
Department of Geography

401 Sunset Avenue, Windsor, Ontario, Canada N9B 3P4, 519/253-4232

APPENDIX 2B

Stage 2-The questionnaire

UNIVERSITY OF WINDSOR
WINDSOR, ONTARIO N9B 3P4
TELEPHONE: AREA CODE 519
253-4232

December 1, 1981

Dear Sir/Madam:

The enclosed questionnaire is designed to gather information about contract vegetable farming in Essex and Kent Counties, Ontario. An essential part of my Master of Arts thesis research, this questionnaire was prepared under the supervision of Dr. I. Stebelsky and the Department of Geography at the University of Windsor. No other group, organization or government agency is involved in this study.

All information from the questionnaire will be held in strict confidence. No names, addresses, or telephone numbers will be needed for the questionnaire. Once the survey has been completed, all information will be transformed into statistical data guaranteeing complete individual privacy.

The questionnaire involves filling in the blanks and checking-off the appropriate categories that apply to you. For your cooperation and time in answering the questionnaire, I will be most grateful. If you have any questions, please contact me or my thesis advisor, Dr. I. Stebelsky, at the Department of Geography, University of Windsor. (Ph. 253-4232, Ext. 669).

Yours sincerely,

I. Stebelsky, Ph.D.
Thesis Advisor

Dennis Tysko
M.A. Thesis Researcher,
Department of Geography

A SURVEY OF CONTRACT VEGETABLE FARMING IN SOUTHWESTERN ONTARIO 1981-82

IMPORTANT: Return the completed questionnaire within 5 days in the stamped self-addressed envelope that has been provided. All information that you provide in this questionnaire will be held in strict confidence. It will be seen only by the person implementing this survey and used in aggregate statistical form.

---

1. If you are involved in contract vegetable farming, which company/companies were you contracted with in 1981 and 1980?

Name of company/companies you were contracted with in 1981	Type of vegetable crop grown	Acreage of vegetable crop
1) _____	_____	____ acres
2) _____	_____	____ acres
3) _____	_____	____ acres
4) _____	_____	____ acres
5) _____	_____	____ acres

Name of company/companies you were contracted with in 1980	Type of vegetable crop grown	Acreage of vegetable crop
1) _____	_____	____ acres
2) _____	_____	____ acres
3) _____	_____	____ acres
4) _____	_____	____ acres
5) _____	_____	____ acres

2. What is the acreage of your farm?

a) Your own land (in acres) ____ acres

b) Land rented from someone else (in acres) ____ acres

3. What is the acreage, harvest (total weight in tons) and sales (total weight in tons) of the vegetable crop or crops you contracted to the company/companies for 1981?

Name of company/ companies	Type of vegetable crop grown	Acreage of crop	Harvest (in tons)	Sale to company (in tons)
1) _____	_____	_____	____ tons	____ tons
2) _____	_____	_____	____ tons	____ tons
3) _____	_____	_____	____ tons	____ tons
4) _____	_____	_____	____ tons	____ tons
5) _____	_____	_____	____ tons	____ tons

4. What is the acreage, harvest (total weight in tons) and sales (total weight in tons) of the vegetable crop or crops you contracted to the company/companies for 1980?

Name of company/ companies	Type of vegetable crop grown	Acreage of crop	Harvest (in tons)	Sale to company (in tons)
1) _____	_____	_____	____ tons	____ tons
2) _____	_____	_____	____ tons	____ tons
3) _____	_____	_____	____ tons	____ tons
4) _____	_____	_____	____ tons	____ tons
5) _____	_____	_____	____ tons	____ tons

5. If the contracted vegetable crop does not meet the quality standards of the company, what do you do with the crop?

Part A

Name of company/ companies	Type of vegetable crop grown	What do you do with the crop? Use on farm	Sale elsewhere
1) _____	_____	Yes☐ No☐	Yes☐ No☐
2) _____	_____	Yes☐ No☐	Yes☐ No☐
3) _____	_____	Yes☐ No☐	Yes☐ No☐
4) _____	_____	Yes☐ No☐	Yes☐ No☐
5) _____	_____	Yes☐ No☐	Yes☐ No☐

Question #5 Continued

Part B

If YES to Use on farm, specify the use of the crop.

Crop	Use on farm-Specific use
1)	
2)	
3)	
4)	
5)	

If YES to Sale elsewhere, specify for what use.

Crop	Sale elsewhere-For what use
1)	
2)	
3)	
4)	
5)	

Part C

If NO to Use on farm or Sale elsewhere, what do you do with the crop?

Crop	What do you do with the crop?
1)	
2)	
3)	
4)	
5)	

6. If the vegetable crop yield exceeds the yield specified by the contract, what do you do with the surplus crop?

_____

_____

_____

7. How far are you located from the company/companies that you contract with?

Name of company/ companies	Type of vegetable crop grown	Distance from company(miles)	Time it takes to deliver crop to company
1)_____	_____	___ road miles	_____
2)_____	_____	___ road miles	_____
3)_____	_____	___ road miles	_____
4)_____	_____	___ road miles	_____
5)_____	_____	___ road miles	_____

8. According to your 1981 contractual agreement with the company/ companies, did you have to have the vegetable crop ready for delivery at a specific time?

Part A

a) Yes ☐ b) No ☐ (If NO, skip to #9)

If YES in Part A, fill out Part B.

Part B

Name of company/ companies	Type of vegetable crop	Get vegetable crop ready for delivery in: (Circle the appropriate answer/answers)							
		HOURS							
		2	4	6	8	10	12	1 day	greater than 1 day
1)_____	_____	2	4	6	8	10	12	1 day	greater than 1 day
2)_____	_____	2	4	6	8	10	12	1 day	greater than 1 day
3)_____	_____	2	4	6	8	10	12	1 day	greater than 1 day
4)_____	_____	2	4	6	8	10	12	1 day	greater than 1 day
5)_____	_____	2	4	6	8	10	12	1 day	greater than 1 day

9. According to your 1981 contractual agreement for vegetables, did you or the company/companies you contracted with supply the following materials and equipment?

	Company _____ Crop _____ Who was the supplier?		Company _____ Crop _____ Who was the supplier?	
Materials and equipment	Yourself	The Company	Yourself	The Company
a) Seeds	☐	☐	☐	☐
b) Fertilizer	☐	☐	☐	☐
c) Herbicides	☐	☐	☐	☐
d) Pesticides	☐	☐	☐	☐
e) Harvesting equipment	☐	☐	☐	☐
f) Equipment to transport crop to the company	☐	☐	☐	☐

10. According to your 1981 contractual agreement for vegetables, did you or the company/companies you contracted with carry out the following tasks?

	Company _____ Crop _____ Who did these tasks?		Company _____ Crop _____ Who did these tasks?	
Various Tasks	Yourself	The Company	Yourself	The Company
a) The seeding	☐	☐	☐	☐
b) The fertilizing	☐	☐	☐	☐
c) The spraying of herbicides	☐	☐	☐	☐
d) The spraying of pesticides	☐	☐	☐	☐
e) The harvesting	☐	☐	☐	☐
f) The transporting of the crop to the company	☐	☐	☐	☐

11. What is the acreage of your crops not under a vegetable contract?

1980 crops not under contract		1981 crops not under contract	
Crop (type)	Acreage	Crop (type)	Acreage
1)_____	____ acres	1)_____	____ acres
2)_____	____ acres	2)_____	____ acres
3)_____	____ acres	3)_____	____ acres
4)_____	____ acres	4)_____	____ acres
5)_____	____ acres	5)_____	____ acres

12. Do you raise any type of livestock?

Part A

a) Yes☐ b) No☐ (If NO, skip to #13)

If YES in Part A, fill out Part B.

Part B

Type of Livestock	Their Number (quantity)
a)_____	_____
b)_____	_____
c)_____	_____
d)_____	_____
e)_____	_____
f)_____	_____

13. According to your 1981 contract did you transport the harvested vegetable crop/crops to the company?

Part A

a) Yes☐ b) No☐ (If NO, skip to #14)

If YES in Part A, answer Part B

Part B

What type of vehicle did you use?

a) Tractor pulled wagon☐

b) Pick-up pulled wagon☐

c) Truck☐

d) None of the above☐
The type of vehicle I used was a: _____

14. Do you have crop insurance to cover either loss of crops or excessive costs? a) Yes☐ b) No☐

15. Is the cropland on which you grow your contracted vegetables tile drained? a) Yes☐ b) No☐

16. Do you grow your contract vegetable crops in rotation with other crops?

a) Yes☐ If YES---Why?_____

_____

b) No ☐ If NO---Why?_____

_____

17. Is farming your full-time occupation? a) Yes☐ b) No☐

18. If NO (Question #17), what other occupations are you involved in?

_____

_____

_____

19. Were you a farmer before you became a contract farmer?

a) Yes☐ b) No☐ (If NO, skip to #21)

20. How long had you been involved in farming before you became a contract farmer?

a) Less than 1 year☐ e) 16 to 20 years☐

b) 1 to 5 years ☐ f) 21 to 25 years☐

c) 6 to 10 years ☐ g) 26 to 30 years☐

d) 11 to 15 years ☐ h) Over 30 years ☐

21. How long have you been involved in contract farming specifically?

a) Less than 1 year☐ e) 16 to 20 years☐

b) 1 to 5 years ☐ f) 21 to 25 years☐

c) 6 to 10 years ☐ g) 26 to 30 years☐

d) 11 to 15 years ☐ h) Over 30 years ☐

22. Since you became involved in contract vegetable farming, has your annual income:

a) Increased greatly ☐ d) Decreased slightly ☐

b) Increased slightly ☐ e) Decreased greatly ☐

c) Not changed ☐

23. What were the reasons why you became involved in contract vegetable farming? (Please rank your reasons in order of importance 1, 2, 3, etc. with #1 being the most important).

Reasons	Rank
a) To gain financial security	___
b) To obtain higher income	___
c) To compensate for lack of funds	___
d) To compensate for lack of farming experience	___
e) To compensate for lack of management skills	___
*Other reasons not mentioned	
f)_____	___
g)_____	___
h)_____	___

24. Are you: a) Married ☐ b) Single ☐

25. Does your spouse help you on the farm?

a) Yes ☐ b) No ☐ (If NO, skip to #27)

26. If YES (Question #25), does she help you on the farm:

a) Daily ☐ b) At peak times only ☐ c) Occasionally ☐

27. Do you have any children?

a) Yes ☐ b) No ☐ (If NO, skip to #29)

28. If YES (Question #27), do the children help you on the farm:

a) Daily ☐ b) At peak times only ☐ c) Occasionally ☐

29. Do you have any brothers or sisters?

a) Yes ☐ b) No ☐ (If NO, skip to #31)

30. If YES (Question #29), do the brothers and sisters help you on the farm:

a) Daily☐ b) At peak times only☐ c) Occasionally☐

31. Do you employ any outside labour on your farm?

a) Yes☐ b) No☐ (If NO, skip to #33)

32. If YES (Question #31), does the outside labour help you:

a) Daily☐ b) At peak times only☐ c) Occasionally☐

33. What is your age?

a) Under 21 years ☐
b) 21 to 30 years ☐
c) 31 to 40 years ☐
d) 41 to 50 years ☐
e) 51 to 60 years☐
f) 61 to 70 years☐
g) Over 70 years ☐

34. What is the highest level of education you have attained?

a) No schooling☐
b) Primary School☐→Specify highest grade__
c) Secondary (High) School☐→Specify highest grade__
d) College☐→Specify number of years in college__ yrs.
e) University☐→Specify number of years in university__ yrs.

35. Have you attended any type of agricultural school or taken any courses related to agriculture?

a) Yes☐ b) No☐ (If NO, skip to #36)

If YES (Question #35), where, when, and for how long?

a) Where?_____
b) When?_____
c) How Long?_____

36. In what range is your annual off-farm income and your annual farm income(contract sales and non-contract sales)?
*(Please check-off the appropriate category or categories that apply to you).

Annual Income	Off-Farm Income	Farm Income	
		Contract	Non-Contract
a) Less than $10,000	☐	☐	☐
b) $10,001 to $20,000	☐	☐	☐
c) $20,001 to $40,000	☐	☐	☐
d) $40,001 to $60,000	☐	☐	☐
e) $60,001 to $80,000	☐	☐	☐
f) $80,001 to $100,000	☐	☐	☐
g) $100,001 and Over	☐	☐	☐

37. What advantages or disadvantages do you see in contract farming?

Advantages	Disadvantages
a)_____	a)_____
b)_____	b)_____
c)_____	c)_____
d)_____	d)_____
e)_____	e)_____
f)_____	f)_____
g)_____	g)_____

Please check to see that you have answered all the questions which are on both sides of each page. THANK YOU for your time and cooperation in filling out this questionnaire.

APPENDIX 2C

Stage 3-Follow-up letter

UNIVERSITY OF WINDSOR

WINDSOR, ONTARIO N9B 3P4

TELEPHONE: AREA CODE 519
253-4232

December 17, 1981

Dear Sir/Madam:

Recently you should have received a questionnaire designed to gather information about contract vegetable farming in Essex and Kent Counties, Ontario. If you have already filled out the questionnaire and returned it, I would like to thank you for your time and co-operation.

If you received the questionnaire but have not yet completed it, I kindly request that you fill out the questionnaire and mail it to me at your earliest convenience. As you are probably aware, the postal rates will be increased on January 1, 1982. This means that the postage on the return envelopes for the questionnaire will be adequate only until December 31, 1981.

Once again I wish to emphasize the importance of this questionnaire as an essential part of my Master of Arts thesis research, and ask for your co-operation.

For your time and effort in answering the questionnaire I will be most grateful. If you have any questions please contact me or my thesis advisor, Dr. I. Stebelsky, at the Department of Geography, University of Windsor, (Ph. 253-4232, Ext. 669).

Yours sincerely,

Dennis Tyenko

Dennis Tyenko
M.A. Thesis Researcher,
Department of Geography

APPENDIX 2D

Stage 4-Follow-up questionnaire

University of Windsor

February 4, 1982

Dear Sir/Madam:

Two months ago, I sent out a questionnaire to gather information about contract vegetable farming in Southwestern Ontario. To date, I have not yet received the completed questionnaire from you.

In case my mailed questionnaire went astray, or that you may have misplaced the former questionnaire, I have enclosed a new revised questionnaire to gather information about contract vegetable farming in Southwestern Ontario.

As you probably know, this questionnaire is an essential part of my Master of Arts thesis research. It was prepared under the supervision of Dr. I. Stebelsky and the Department of Geography at the University of Windsor. No other group, organization or government agency is involved in this study.

All information from this questionnaire will be held in strict confidence. No names, addresses, or telephone numbers will be needed for this questionnaire. Once the survey has been completed, all information will be transformed into statistical data guaranteeing complete individual privacy.

The questionnaire involves filling in the blanks and checking-off the appropriate categories that apply to you. For your cooperation and time in answering the questionnaire, I will be most grateful. If you have any questions, please contact me or my thesis advisor, Dr. I. Stebelsky, at the Department of Geography, University of Windsor, (Ph. 253-4232, Ext. 669).

Yours sincerely,

I. Stebelsky, Ph. D.
Thesis Advisor

Dennis Tyszko
M.A. Thesis Researcher,
Department of Geography

401 Sunset Avenue, Windsor, Ontario, Canada N9B 3P4, 519/253-4232

University of Windsor

APPENDIX 2E

Stage 5-Final follow-up letter

March 18, 1982

Dear Sir/Madam:

One month ago, I sent out a revised questionnaire to gather information about contract vegetable farming. To date, I have not received the completed questionnaire from you.

I wish to inform you that my cut-off date for collecting the questionnaire on contract vegetable farming is Wednesday, March 31, 1982. After that date the responses will be processed and analysed. If you still have the survey, please take a few minutes to fill it out and send it to me as soon as possible in the self-addressed envelope that was provided. Your positive response will help me do a better study of contract farming in Southwestern Ontario. I deeply appreciate your cooperation.

Yours sincerely,

Dennis Tyszko

Dennis Tyszko
M.A. Thesis Researcher,
Department of Geography

401 Sunset Avenue, Windsor, Ontario, Canada N9B 3P4, 519/253-4232

APPENDIX 3A

For Kendall Tau it is necessary to:

1) Use an analysis table with the independent variable (x) values put into rank order and the dependent (y) values are situated beside the (x) values.

2) Calculate S which is a measurement of the degree of orderliness displayed by the dependent variable (y) pertaining to the independent variable (x). S is found by checking each rank in the (y) dependent variable row and the ranks to the right of each rank. The next step is to count the number of larger ranks to the right of the rank under consideration and numerate the number of smaller ranks to the right of the rank being checked. S is the sum of the differences between the enumeration of the larger ranks and the enumeration of the smaller ranks for each rank being observed.

3) The S equation can be recorded as: $S = (f_L - f_S)$ where f_L is the frequency of larger ranks to the rank being checked and f_S is the frequency of smaller ranks to the right of the rank being examined.

4) To compensate for ties which may occur in (x) or (y), a correction factor is necessary to get a true estimate of Tau. For the correction of ties, one must find "t" which involves enumerating the number of tied scores in a tied group of scores. The correction factors T_x and T_y are calculated for each variable by the equations:

$T_x = \frac{1}{2}$ + (t + 1) for the x independent variable group and $T_y = \frac{1}{2}$ + (t + 1) for the y dependent variable group.

5) T_x and T_y are then substituted into the modified Tau equation: $Tau = S/ (\frac{1}{2}N(N-1)-T_x)^{\frac{1}{2}} + (\frac{1}{2}N(N-1)-T_y)^{\frac{1}{2}}$. This method is required, because ties tend to depreciate the value of Tau.

6) Once Tau is found, the null hypothesis that Tau equals zero is rated by tabled values of Tau or by a z-test based on the standard normal distribution. The standard error of Tau is found by the following equation: $S_+ = ((4N+10)/9N^2-N))^{\frac{1}{2}}$. Also Tau divided by this standard error gives a value that is distributed like the standard normal deviate $Z = (Z_o=Tau)S_t$. If Z_o surpasses Z_c, the null hypothesis is rejected and it is accepted that a significant correlation occurs. If Z_o does not exceed Z_c the null hypothesis is accepted, implying that there is no correlation. The sign affiliated with the Z_o value should be disregarded because negative correlations are just as significant as positive ones.

Sources: a) La Valle, pp. 210-214.

b) Blalock, (1961) pp. 319-325.

APPENDIX 3B

Kendall Tau for Hypotheses 1, 2, 3, and 4

	No. of Cases	S	TX	TY	TAU	*Zo	Zc at .05	Hypothesis
1. a)	40	-106	52	84	-0.1489	-1.3536	1.684	Accept
b)	34	23	47	23	0.0437	-0.3635	1.691	Accept
c)	21	-41	26	25	-0.2222	-1.4098	1.721	Accept
d)	48	-124	53	75	-0.1165	-0.1165	1.678	Accept
2. a)	39	5	49	414	0.0105	0.0941	1.685	Accept
b)	33	-9	44	227	0.0246	-0.2860	1.692	Accept
c)	16	4	11	42	0.0433	0.2341	1.746	Accept
d)	46	37	32	780	0.0731	0.1020	1.679	Accept
3. a)	38	17	70	373	0.0371	0.3280	1.686	Reject
b)	30	-24	32	174	-0.0740	0.5745	1.697	Reject
c)	14	-13	15	46	-0.2222	-1.1071	1.761	Reject
d)	43	-52	62	709	-0.1287	-1.2164	1.679	Reject
4. a)	40	-16	74	415	-0.0315	-0.2863	1.684	Reject
b)	34	-39	39	246	-0.0961	-0.8008	1.691	Reject
c)	49	15	81	1128	0.0654	0.6632	1.676	Reject
d)	17	-1	16	45	-0.0113	0.0896	1.740	Reject

*According to LaValle (p. 213), the sign associated with the Zo value should be ignored, because negative correlations can be just as significant as positive ones.

APPENDIX 3C

Chi-Square for Hypothesis 5
Contracting Experience and Contracted Acreage
(Green Giant and Libby's Growers)

Contracting Experience	Contracted Acreage				
	0-20 acres	21-40 acres	41-60 acres	60 acres	Row Total
Less than 1 year	3	7	5	1	16
1 to 10 years	10	14	12	3	39
11 to 20 years	6	14	7	7	34
21 years and over	10	11	3	8	32
Column Total	29	46	27	19	121

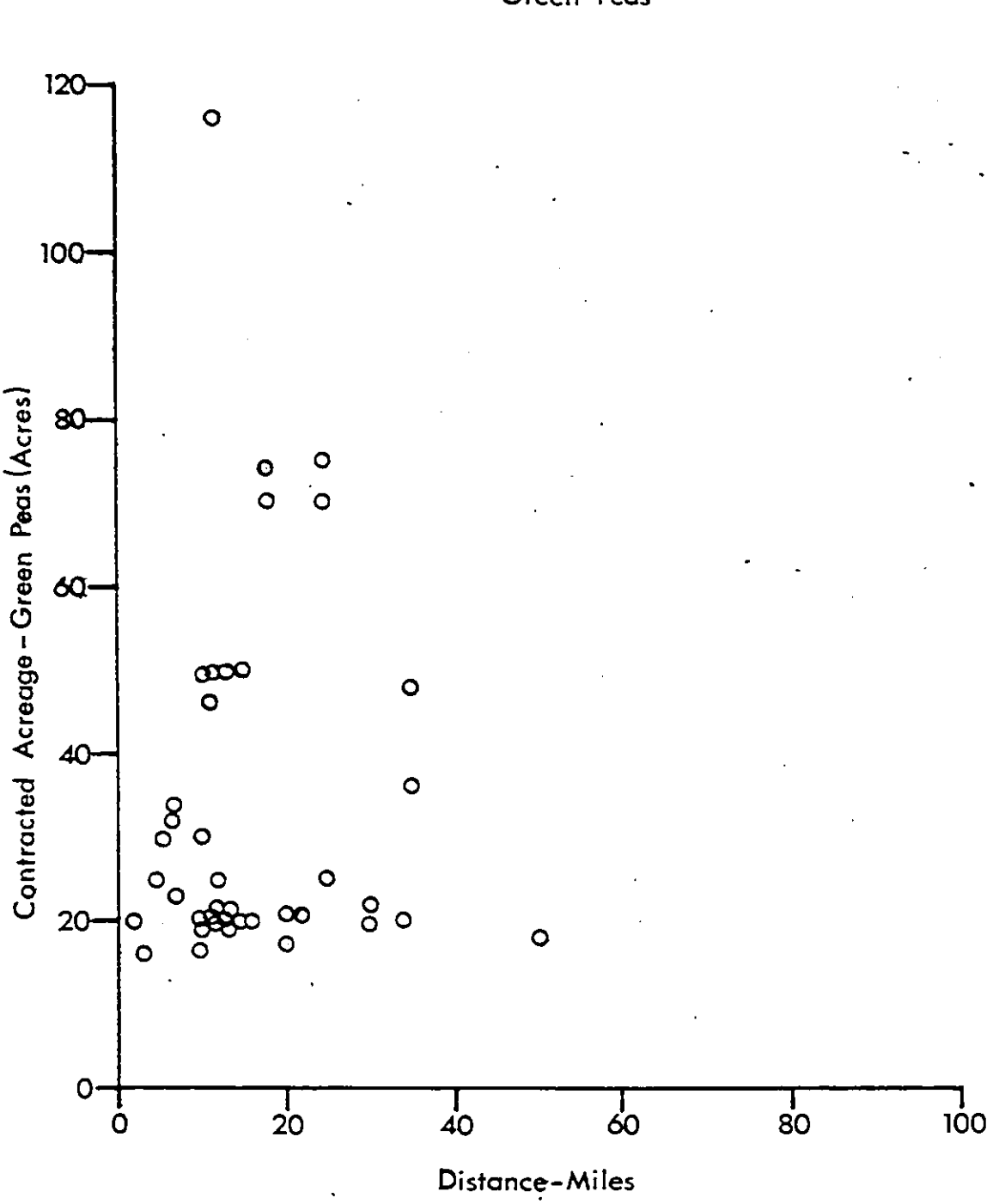
Degrees of Freedom = 9

$X^2o = 10.28$

X^2c at .05 = 16.92

APPENDIX 3D

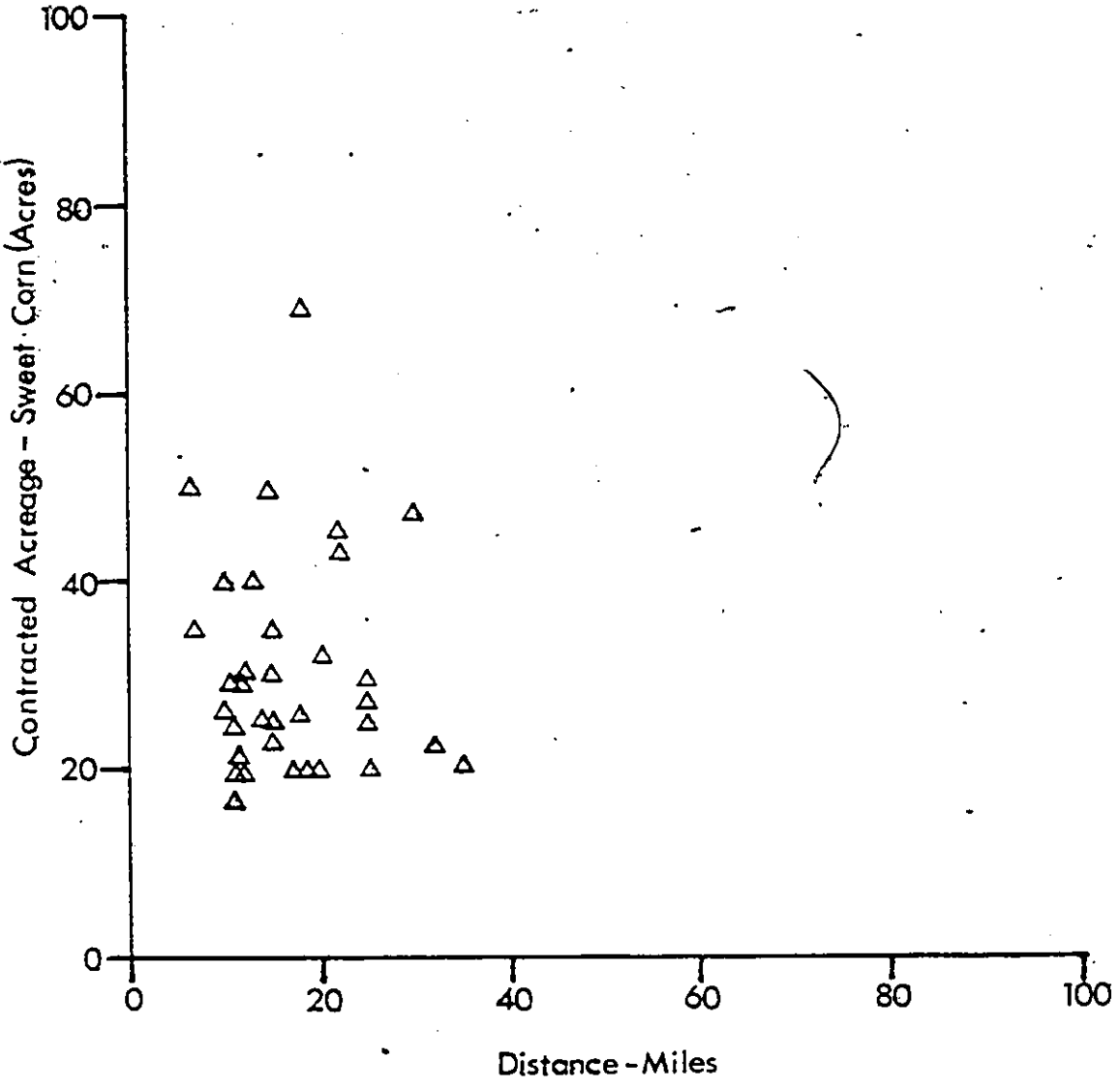
GREEN GIANT - DISTANCE AND CONTRACTED ACREAGE



APPENDIX 3E

GREEN GIANT - DISTANCE AND CONTRACTED ACREAGE

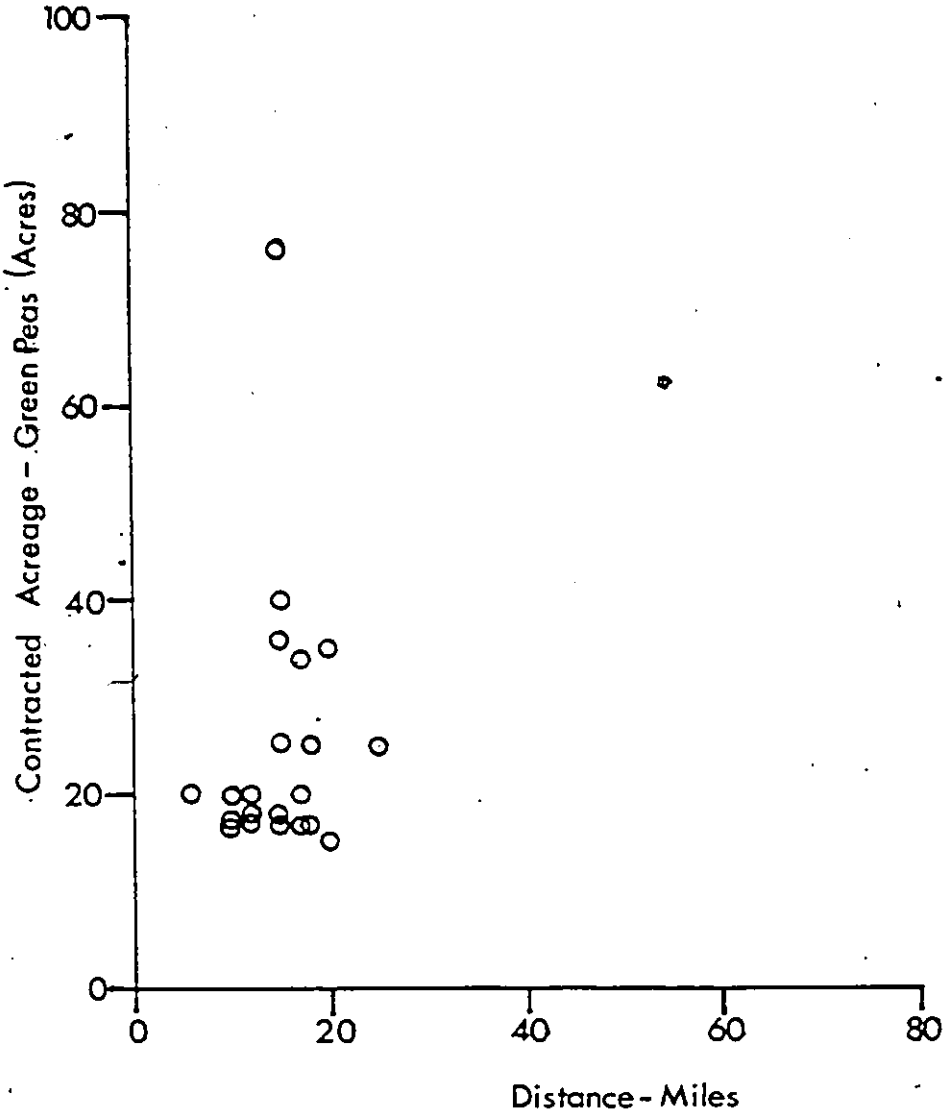
Sweet Corn



APPENDIX 3F

LIBBY'S - DISTANCE AND CONTRACTED ACREAGE

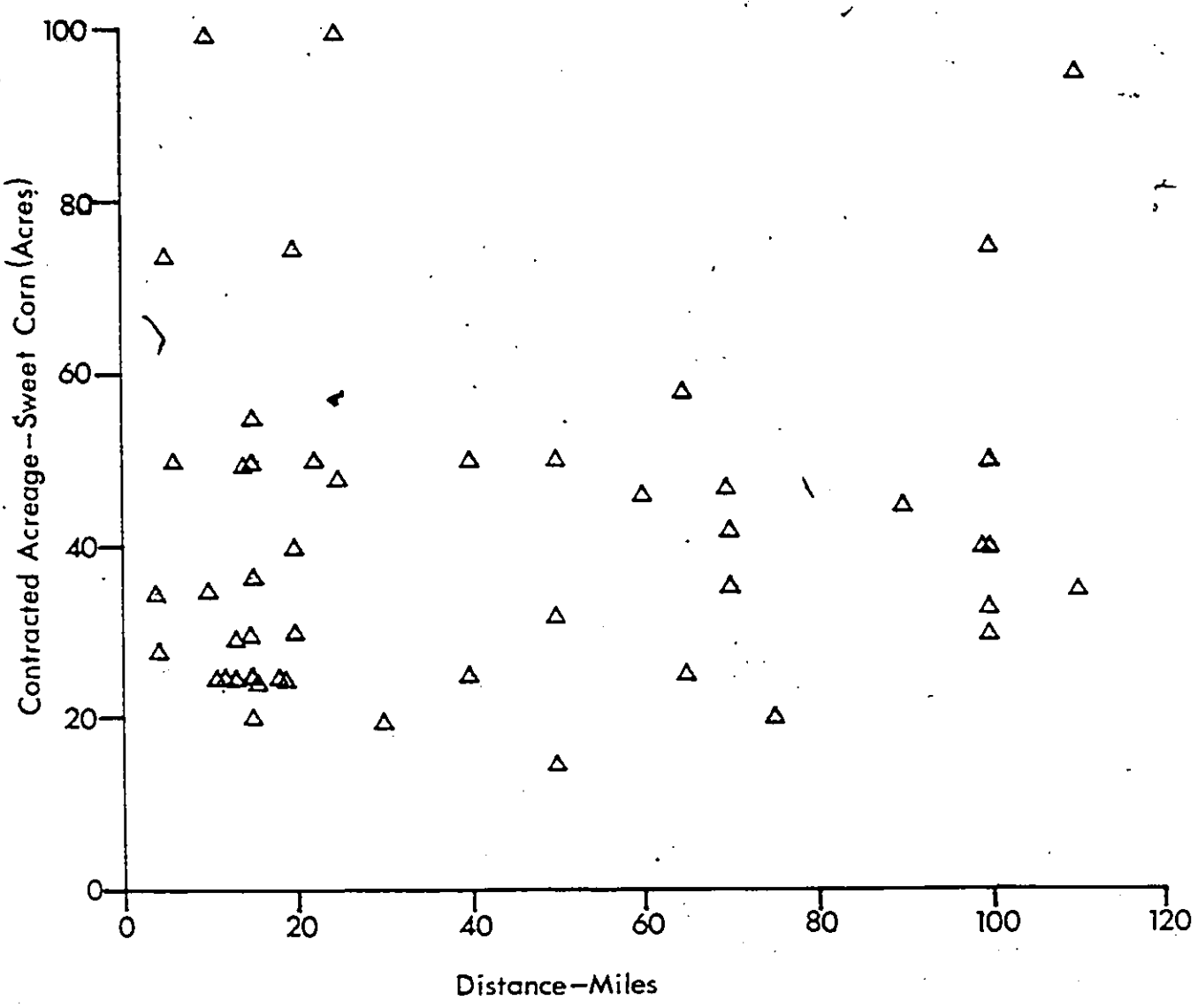
Green Peas



APPENDIX 3G

LIBBY'S DISTANCE AND CONTRACTED ACREAGE

Sweet Corn



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